ENVIRONMENTAL ASSESSMENT

Reducing Pigeon, Starling, Sparrow, Blackbird, Mourning Dove, Vulture and Crow Damage Through an Integrated Wildlife Damage Management Program in the State of Alabama

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ANIMAL AND PLANT HEALTH INSPECTION SERVICE
WILDLIFE SERVICES

In Cooperation With:

TENNESSEE VALLEY AUTHORITY

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SUMMARY OF PROPOSED ACTION

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) proposes to continue the current Rock Pigeon (feral pigeons) (*Columba livia*), Mourning Dove (*Zenaida macroura*), Black Vulture (*Coragyps atratus*), Turkey Vulture (*Cathartes aura*), European Starling (*Sturnus vulgaris*), House Sparrow (*Passer domesticus)*, Red-winged Blackbird (*Agelaius phoeniceus*), Brown-headed Cowbird (*Molothrus ater*), Common Grackle (*Quiscalus quiscula*), and American Crow (*Corvus brachyrhynchos*) damage management program in the State of Alabama. An Integrated Wildlife Damage Management (IWDM) approach would be implemented to reduce damage activities to property, agricultural and natural resources, livestock, and public health and safety. Damage management would be conducted on property in Alabama when the resource owner (property owner) or manager requests assistance. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying WS' Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification or harassment would be recommended and utilized to reduce damage. In other situations, birds would be removed as humanely as possible using shooting, trapping, and EPA registered pesticides. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. Bird damage management activities would be conducted in the State, when requested and funded, on private or public property, including airport facilities and adjacent or nearby properties, after an *Agreement for Control* or other comparable document has been completed. All management activities, including disposal requirements, would comply with appropriate Federal, State, and local laws.

ACRONYMS

ADC	Animal Damage Control
AC	Alpha-Chloralose
ACES	Alabama Cooperative Extension System
ADPH	Alabama Department of Public Health
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
BBS	Breeding Bird Survey
BDM	Bird Damage Management
BO	Biological Opinion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FDA	Food and Drug Administration
FEIS	Final Environmental Impact Statement
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FY	Fiscal Year
GRAS	Generally Recognized as Safe
IWDM	Integrated Wildlife Damage Management
MA	Methyl Anthranilate
MIS	Management Information System
MOU	Memorandum of Understanding
MBTA	Migratory Bird Treaty Act
NASS	National Agricultural Statistics Service
NEPA	National Environmental Policy Act
NOA	Notice of Availability
NWRC	National Wildlife Research Center
RPA	Reasonable and Prudent Alternative
RPM	Reasonable and Prudent Measure
SOP	Standard Operating Procedure
T&E	Threatened and Endangered
TGE	Transmissible Gastroenteritis
TVA	Tennessee Valley Authority
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFWS	U.S. Fish and Wildlife Service
WN	West Nile
WS	Wildlife Services

CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.0 INTRODUCTION

Across the United States, wildlife habitat has been substantially changed as human populations expand and land is used for human needs. These human uses and needs often compete with wildlife which increases the potential for conflicting human/wildlife interactions. Many species have adapted to human induced changes to the environment and often thrive where humans are present. These species, in particular, are responsible for the majority of conflicts between humans and wildlife. The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Animal Damage Control (ADC)[1] programmatic Final Environmental Impact Statement (FEIS) summarizes the relationship in American culture of wildlife values and wildlife damage in this way (USDA 1997):

> "*Wildlife has either positive or negative values, depending on varying human perspectives and circumstances . . . Wildlife is generally regarded as providing economic, recreational and aesthetic benefits . . . and the mere knowledge that wildlife exists is a positive benefit to many people. However . . . the activities of some wildlife may result in economic losses to agriculture and damage to property . . . Sensitivity to varying perspectives and value is required to manage the balance between human and wildlife needs. In addressing conflicts, wildlife managers must consider not only the needs of those directly affected by wildlife damage but a range of environmental, sociocultural and economic considerations as well.*"

The USDA is authorized to protect agricultural resources, natural resources, and property from damage along with threats to human health and safety from wildlife. This function is carried out by the USDA, APHIS, Wildlife Services (WS) program. WS is authorized to protect resources from wildlife damage through the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c). Wildlife damage management is the alleviation of damage or other conflicts caused by wildlife. WS uses an Integrated Wildlife Damage Management (IWDM) approach in which a combination of methods may be used or recommended to reduce wildlife damage (WS Directive 2.105). WS' IWDM approach to managing wildlife damage is further described in WS' FEIS (USDA 1997).

WS' mission, developed through its strategic planning process, is to provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources and to safeguard public health and safety. WS' Policy Manual[2] reflects this mission and provides guidance for engaging in wildlife damage management through:

- Training of wildlife damage management professionals;
- Development and improvement of strategies to reduce losses and threats to humans from wildlife;
- Collection, evaluation, and dissemination of management information;
- Informing and educating the public on how to reduce wildlife damage;
- Providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1989)

[1] On August 1, 1997, the Animal Damage Control program was officially renamed to Wildlife Services. The terms Animal Damage Control, ADC, Wildlife Services, and WS are used synonymously throughout this document.

[2] WS' Policy Manual provides guidance for WS' personnel to conduct wildlife damage management activities through Directives. WS' Directives referenced in the EA can be found in the WS' Policy Manual but will not be referenced in the Literature Cited Appendix.

WS' activities are conducted to prevent or reduce wildlife damage to agricultural, industrial and natural resources, property, livestock, and threats to public health and safety on private and public lands in cooperation with federal, state and local agencies, private organizations, and individuals. This Environmental Assessment (EA) evaluates a portion of WS' activities, specifically damage to agriculture, property, natural resources, and threats to human health and safety caused by certain bird species in Alabama.

1.1 PURPOSE

Normally, according to the APHIS' procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions could be categorically excluded (7 CFR 372.5(c), 60 Fed. Reg. 6000-6003, (1995)). To evaluate potential individual and cumulative impacts to the human environment from WS' actions to resolve bird damage in Alabama and to clearly communicate to the public the analysis of those potential impacts, WS is preparing this EA. The development of this EA will also be used by WS to assist in planning, to facilitate interagency coordination, and to streamline program management. The analyses contained in the EA are based on information derived from WS' Management Information System (MIS) and published documents (Appendix A), including the analyses in WS' programmatic FEIS to which this EA is tiered[3] (USDA 1997). WS' FEIS contains a detailed discussion of potential environmental impacts of methods used by WS' to manage bird damage in Alabama. WS' FEIS may be obtained by contacting USDA/APHIS/WS Operational Support Staff at 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

This EA documents the analysis of the potential environmental effects of a proposed Rock Pigeon (feral pigeons) (*Columba livia*), Mourning Dove (*Zenaida macroura*), Black Vulture (*Coragyps atratus*), Turkey Vulture (*Cathartes aura*), European Starling (*Sturnus vulgaris*), House Sparrow (*Passer domesticus*), Red-winged Blackbird (*Agelaius phoeniceus*), Brown-headed Cowbird (*Molothrus ater*), Common Grackle (*Quiscalus quiscula*), and American Crow (*Corvus brachyrhynchos*) bird damage management (BDM) program in Alabama.

For purposes of this document, common names of bird species may be shortened and aggregated to reduce document size but will only refer to the aforementioned bird species. Blackbirds often form mixed species flocks during migration and while roosting. The term blackbird will be used to describe the following species addressed in this EA: Red-winged Blackbirds, Brown-headed Cowbirds, and Common Grackles. When addressing damage associated with flocks of mixed blackbird species, the Red-winged Blackbird, Brown-headed Cowbird, and Common Grackle are the species most likely specifically addressed when alleviating or reducing damage associated with blackbirds.

1.2 NEED FOR ACTION

1.2.1 Need for Bird Damage Management in Alabama

The need for action in Alabama is based on the necessity for a program to protect agricultural and natural resources, property, and human health and safety from pigeon, dove, vulture, starling, blackbird, crow and sparrow damage as requested by cooperators. Comprehensive surveys of damage attributed to bird species have not been conducted in Alabama. However, WS has compiled the number of requests for damage management assistance received from property and resource owners or managers and public health and safety risks from Fiscal Year[4] (FY) 1999 through FY 2006 (See

[3] Council on Environmental Quality (CEQ) regulations encourage federal agencies to tier Environmental Assessments to previously prepared Environmental Impact Statements and to incorporate material by reference in order to reduce the volume of National Environmental Policy Act (NEPA) documents (40 CFR 1502.20, 40 CFR 1502.21). To comply with CEQ regulations, information and analyses contained in WS' FEIS have been referenced in this EA.

[4] The federal fiscal year extends from October 1 through September 30.

Table 1-1). Data contained in Table 1-1 only represents data from cooperators requesting assistance from WS which is a portion of the total damage caused by pigeons, doves, vultures, starlings, crows, blackbirds and sparrows since not all people who experience damage request assistance from WS.

Table 1-1. Requests for damage management assistance received by Wildlife Services for Pigeons, Starlings, Blackbirds, Sparrows, American Crows, Mourning Doves, and Vultures in Alabama (WS' MIS 1999 - 2006).*

FY	Species	Agriculture	Natural Resources	Property	Public Health/Safety
1999	Pigeons	0	0	10	1
	Starlings	0	0	0	0
	Blackbirds	0	0	3	13
	Sparrows	0	0	3	0
	Doves	0	0	0	1
	Vultures	2	0	23	4
2000	Pigeons	0	0	6	13
	Starlings	0	0	1	2
	Crows	0	0	0	3
	Blackbirds	0	0	1	9
	Sparrows	0	0	0	0
	Doves	0	0	0	1
	Vultures	4	0	9	6
2001	Pigeons	0	0	2	2
	Crows	1	0	0	2
	Blackbirds	0	0	7	8
	Doves	0	0	0	2
	Vultures	0	0	7	4
2002	Pigeons	0	0	1	3
	Starlings	0	0	5	2
	Crows	0	0	0	3
	Blackbirds	0	0	0	2
	Sparrows	0	0	2	0
	Doves	0	0	0	3
	Vultures	16	0	12	2
2003	Pigeons	0	0	1	1
	Starlings	0	0	1	6
	Crows	0	0	1	0
	Blackbirds	1	0	2	6
	Sparrows	0	0	3	0
	Doves	0	0	0	1
	Vultures	2	0	27	8
2004	Pigeons	0	0	6	4
	Starlings	0	0	2	0
	Blackbirds	0	0	0	2
	Doves	0	0	0	1
	Vultures	7	0	23	0
2005	Pigeons	0	0	3	1

	Starlings	0	1	4	0
	Blackbirds	0	0	1	1
	Sparrows	0	0	1	0
	Vultures	5	0	9	0
2006	Pigeons	0	0	2	0
	Vultures	4	0	7	0
	Crows	1	0	0	0
	Sparrows	0	0	1	0

*Absent species indicates no damage reports for that particular fiscal year.

1.2.2 Need For Bird Damage Management to Protect Human Health and Safety

Birds can play an important role in the transmission of zoonotic diseases where humans may come into contact with fecal droppings of birds. Rock Pigeons, House Sparrows, blackbirds and European Starlings have been suspected in the transmission of 29 different diseases to humans (Davis et al. 1971, Weber 1979, Stickely and Weeks 1985). These include viral diseases such as meningitis and seven different forms of encephalitis; bacterial diseases such as erysipeloid, salmonellosis, paratyphoid, Pasteurellosis, and Listeriosis; mycotic (fungal) diseases such as aspergillosis, blastomycosis, candidiasis, cryptococcosis, histoplasmosis, and sarcosporidiosis; protozoal diseases such as American trypansomiasis and toxoplasmosis; and rickettsial/chlamydial diseases such as chlamydiosis and Q fever. As many as 65 different diseases transmittable to humans or domestic animals have been associated with pigeons, starlings, and sparrows (Weber 1979). Table 1-2 shows the more typical diseases that have the potential to infect humans exposed to fecal droppings that can be transmitted by pigeons, sparrows, and starlings.

Table 1-2. Diseases Associated With Rock Pigeons, European Starlings, and House Sparrows Transmissible To Humans and Livestock (Weber 1979).

Disease	Human Symptoms	Potential for Human Fatality	Effects on Domestic Animals
Bacterial:			
erysipeloid	skin eruption with pain, itching; headaches, chills, joint pain, prostration, fever, vomiting	sometimes - particularly to young children, old or infirm people	serious hazard for the swine industry
salmonellosis	gastroenteritis, septicemia, persistent infection	possible, especially in individuals weakened by other disease or old age	causes abortions in mature cattle, possible mortality in calves, decrease in milk production in dairy cattle
Pasteurellosis	respiratory infection, nasal discharge, conjunctivitis, bronchitis, pneumonia, appendicitis, urinary bladder inflammation, abscessed wound infections	rarely	may fatally affect chickens, turkeys and other fowl
Listeriosis	conjunctivitis, skin infections, meningitis in newborns, abortions, premature delivery, stillbirth	sometimes - particularly with newborns	In cattle, sheep, and goats, difficulty swallowing, nasal discharge, paralysis of throat and facial muscles
Viral:			
meningitis	inflammation of membranes covering the brain , dizziness, and nervous movements	possible X can also result as a secondary infection with listeriosis, salmonellosis, cryptococcosis	causes middle ear infection in swine, dogs, and cats

encephalitis (7 forms)	headache, fever, stiff neck, vomiting, nausea, drowsiness, disorientation	mortality rate for eastern equine encephalomyelitis may be around 60%	may cause mental retardation, convulsions and paralysis
Mycotic (fungal):			
aspergillosis	affects lungs and broken skin, toxins poison blood, nerves, and body cells	not usually	causes abortions in cattle
blastomycosis	weight loss, fever, cough, bloody sputum and chest pains.	rarely	affects horses, dogs and cats
candidiasis	infection of skin, fingernails, mouth, respiratory system, intestines, and urogenital tract	rarely	causes mastitis, diarrhea, vaginal discharge and aborted fetuses in cattle
cryptococcosis	lung infection, cough, chest pain, weight loss, fever or dizziness, also causes meningitis	possible especially with meningitis	chronic mastitis in cattle, decreased milk flow and appetite loss
histoplasmosis	pulmonary or respiratory disease. May affect vision	possible, especially in infants and young children or if disease disseminates to the blood and bone marrow	infected livestock frequently lose weight; dairy cattle milk production can drop significantly
Protozoal:			
toxoplasmosis	inflammation of the retina, headaches, fever, drowsiness, pneumonia, strabismus, blindness, hydrocephalus, epilepsy, and deafness	possible	may cause abortion or still birth in humans, mental retardation
Rickettsial /Chlamydial:			
chlamydiosis	pneumonia, flu-like respiratory infection, high fever, chills, loss of appetite, cough, severe headaches, generalized aches and pains, vomiting, diarrhea, hepatitis, insomnia, restlessness, low pulse rate	occasionally, restricted to old, weak or those with concurrent diseases	in cattle, may result in abortion, arthritis, conjunctivitis, and enteritis
Q fever	sudden pneumonitis, chills, fever, weakness, severe sweating, chest pain, severe headaches and sore eyes	possible	may cause abortions in sheep and goats

Few studies are available on the occurrence and transmission of zoonotic diseases in wild birds. Study of this issue is complicated by the fact that some disease-causing agents associated with birds may also be contracted from other sources. The risk of disease transmission from birds to humans is likely very low. However, human exposure to fecal droppings through direct contact or through the disturbance of accumulations of fecal droppings where disease organisms are known to occur increases the likelihood of disease transmission. Pigeons, starlings, blackbirds, and sparrows are closely associated with human habitation and often exhibit gregarious roosting and nesting behavior. This gregarious behavior leads to accumulations of fecal droppings that can be considered a threat to human health and safety due to the close association of those species of birds with human activity. Accumulations of bird droppings in public areas are aesthetically displeasing and are often in areas

where humans may come in direct contact with fecal droppings. The primary two human health issues related to the avian transmission of diseases are salmonella and histoplasmosis.

Histoplasmosis is a fungal disease that affects the lungs which is caused by the organism *Histoplasma capsulatum*. The accumulated feces at bird roosts have long been known to be associated with the occurrence of the illness. In most instances of health risks associated with bird roosts, the roost has been in place for a period of years. The disease is generally contracted when the soil/feces below the roost is disturbed by wind on dry soil or human activity. Long term residents of areas near roosts often test positive for Histoplasma exposure. Viable *H. capsulatum* remains in the soil and can be contracted several years after the roost is abandoned (Clark and McLean 2003).

In Alabama, crows, blackbirds and starlings form large communal roosts of the kind associated with disease organisms which grow in soils enriched by bird excrement, such as *H. capsulatum* (Weeks and Stickley 1984). Such roosts are known to occur in areas closely associated with human activity. Public health officials and residents at such sites express concerns for human health related to the potential for disease transmission where dropping deposits accumulate. WS routinely receives requests for assistance in resolving problems related to large urban crow, blackbird and starling roosts in Alabama.

Salmonellosis is a well documented human and animal pathogen. In humans, this organism most often results in "food poisoning" characterized by acute intestinal pain and diarrhea. Several types of the *Salmonella* bacteria are carried by wild birds with varying degrees of impact on humans and livestock. Friend (1999) reported relative rates of detection of *Salmonella* spp. in free ranging birds. *Salmonella* spp. isolates were frequent in songbirds, common in doves and pigeons, occasional in starlings, blackbirds and cowbirds, and infrequent in crows.

In most cases, the risk of disease transmission is the primary reason for requesting and conducting BDM. Situations in Alabama where WS may be requested to assist in the reduction of disease threats to human health and safety could include:

- exposure of residents to large accumulations of fecal droppings from a European Starling roost which has been in a residential area for several years;
- disturbance of a large deposit of fecal matter in an attic where a flock of Rock Pigeons routinely roosts or nests;
- accumulations of fecal droppings from nesting, loafing, and/or roosting European Starlings, Rock Pigeons, or House Sparrows on structures at industrial sites where employees may be exposed to fecal droppings through direct contact.

1.2.3 Need For Bird Damage Management at Airports

The civil and military aviation communities have acknowledged that the threat to human health and safety from aircraft collisions with wildlife is increasing (Dolbeer 2000). Collisions between aircraft and wildlife are a concern throughout the world because they threaten passenger safety (Thorpe 1996), result in lost revenue, and repairs to aircraft can be costly (Linnell et al. 1996, Robinson 1996). Aircraft collisions with wildlife can also erode public confidence in the air transport industry as a whole (Conover et al. 1995). In several instances, wildlife-aircraft collisions in the United States have resulted in human fatalities. In 1995, an Air Force E-3B AWACS aircraft collided with a flock of Canada geese at Elmendorf Air Force Base, Alaska, killing all 24 passengers and crew. In addition, a $190 million plane was lost (Dolbeer 1997). The risk that birds pose to aircraft is well documented with the worst case reported in Boston in 1960 when 62 people were killed in the crash of an airliner

which collided with a flock of European Starlings (Terres 1980). In 1999, a Boeing 757 struck a flock of European Starlings at the Cincinnati/Northern Kentucky International Airport and was forced to abort the flight (NTSB 1999). Damages were assessed at more than $500,000 by airport officials (D.T. Little, USDA/APHIS/WS, pers. comm. 1999). In September of 2005, a Falcon 20 aircraft departing from a regional airport in Ohio hit a flock of Mourning Doves just after take-off causing an engine to flame out. A second flock was hit soon after, causing the second engine to lose power. The aircraft sustained damages exceeding the value of the aircraft while the copilot sustained minor injuries (Cleary et al. 2006).

Starlings and blackbirds, when in large flocks or flight lines entering or exiting a winter roost at or near airports, present a safety threat to aviation. Starlings and blackbirds are a particularly dangerous bird to aircraft during take-offs and landings because of their high body density and tendency to travel in large flocks of hundreds to thousands of birds (Seamans et al. 1995). Mourning Doves also present similar risks when their late summer behaviors include creating large roosting and loafing flocks. Their feeding, watering and gritting behavior on airport turf and runways further increases the risk of bird-aircraft collisions. Vulture species can also present a risk to aircraft because of their large body mass and slow-flying or soaring behavior. Vultures are considered to be the most hazardous bird for an aircraft to strike based on the frequency of strikes, effect on flight, and amount of damage caused by vultures throughout the country (Dolbeer et al. 2000).

From 1990-2000, 34,370 wildlife strikes were reported to the FAA. Birds were involved with over 97% of those reported strikes to civil aircraft in the USA (Cleary et al. 2002). This number is likely to be much greater since an estimated 80% of civil bird strikes go unreported (Cleary et al. 2005, Wright and Dolbeer 2005). In 2000, reported wildlife strikes increased 16% over the number of wildlife strikes that were reported in 1999. From 1990-2005, 582 bird strikes were reported in Alabama (Cleary et al. 2005). Of the wildlife strikes in Alabama from 1990, approximately 30% were attributed to Mourning Doves and almost 13% were attributed to blackbirds and starlings (FAA 2006). In addition, 2.4% of strikes were attributed to vultures resulting in 768 hours of lost aircraft operation and over $7,000 of damage. Three of the seven vulture strikes reported to the FAA occurred with military aircraft.

WS receives requests annually for assistance regarding bird damage management at airports in Alabama.

1.2.4 Need for Bird Damage Management to Protect Agriculture

Agriculture is one of Alabama's leading industries. There were 43,500 farms encompassing 8.6 million acres in Alabama in 2002. Cash receipts from farm commodities (not including forestry) totaled just over $3.3 billion in 2002 (Alabama Agricultural Statistics 2005). The top two farm commodities for cash receipts were poultry and cattle and calves, which together, accounted for 75% of the cash receipts. Alabama's poultry industry ranks third in the U.S. in broiler production and thirteenth in egg production. The cattle inventory in Alabama on January 1, 2007 was 1.32 million head, ranking the State twenty-eighth in the nation (National Agricultural Statistics Service 2007).

Vultures are known to prey upon newly born calves and harass adult cattle, especially during the birthing process throughout Alabama. Blackbirds, starlings, sparrows, and, to a lesser extent, pigeons and crows often cause damage at cattle feeding facilities and dairies by congregating in large numbers to feed on the grain component of cattle feed. Large concentrations of birds can cause economic losses to producers by removing critical components of livestock feed needed to ensure proper growth and a healthy livestock herd. Birds also defecate while feeding increasing the possibility of disease transmission through livestock directly contacting or consuming fecal droppings. The birds also cause damage by defecating on fences, shade canopies, and other structures, which can accelerate

corrosion of metal components and can be aesthetically displeasing. Large concentrations of birds at livestock feeding operations can also pose potential health hazards to feedlot/dairy operators and their personnel through directly contacting fecal droppings or by droppings creating unsafe working conditions.

Scope of Livestock Losses. The National Agricultural Statistics Service (NASS) reported livestock owners lost 8,600 head of cattle and calves from vultures in 2006 valued at $3.8 million (National Agriculture Statistics Service 2006). While both Turkey Vultures and Black Vultures have been documented harassing expectant cattle, WS in Alabama has documented calf predation by Black Vultures. Black Vulture predation on livestock is distinctive. Lovell (1947, 1952) and Lowney (1999) reported Black Vultures killed pigs by pulling eyes out followed by attacks to the rectal area or directly attacking the rectal area. WS in Alabama has also documented reports of birthing cows being harassed and distressed by Black Vultures. During a difficult delivery, Black Vultures will peck at the half-expunged calf and kill it. Reports of calf depredation occur throughout Alabama but are not necessarily common. Many livestock producers do not leave birthing cows unattended. Calf depredation was reported to WS in 40 different incidents in Alabama from FY 1999 to FY 2006.

Scope of Livestock Feed Losses. The problem of starling damage to livestock feed has been documented in France and Great Britain (Feare 1984), and in the United States (Besser et al. 1968). Livestock feeding operations and dairies can concentrate European Starlings, House Sparrows, blackbirds, and Rock Pigeons due to the availability and easy access to a food source. Livestock feed is specially designed and mixed to meet the dietary needs of cattle. The basic constituent of most rations is silage and the high energy portion is usually provided as barley, which may be incorporated as whole grain, crushed, or ground cereal. While cattle cannot select individual ingredients from that ration, birds can and do select the barley, thereby altering the energetic value of the ration. In one study, the removal of this high energy component by European Starlings, was believed to reduce milk yields, weight gains, and was economically critical (Feare 1984). Glahn and Otis (1986) reported that starling damage was also associated with proximity to roosts, snow cover, temperatures, and the number of livestock on feed.

The economic significance of feed losses to European Starlings has been demonstrated by Besser et al. (1968) who concluded that the value of losses in feedlots near Denver, Colorado was $84 per 1,000 birds in 1967. Forbes (1995) reported European Starlings consume up to 50% of their body weight in feed each day. Glahn and Otis (1981) reported losses of 4.8 kg of pelletized feed consumed per 1,000 bird minutes. Glahn (1983) reported that 25.8% of farms in Tennessee experienced starling depredation problems of which 6.3% experienced considerable economic loss. Williams (1983) estimated seasonal feed losses to five species of blackbirds (primarily Brown-headed Cowbirds) at one feedlot in south Texas at nearly 140 tons valued at $18,000.

Livestock feed losses from birds is not commonly reported in Alabama. Consumption of livestock feed by birds is often a secondary concern to the threat of disease transmission from birds defecating in livestock rations as they feed.

Scope of Livestock Health Problems. A number of diseases that affect livestock have been associated with pigeons, starlings, blackbirds, and sparrows (Weber 1979). Transmission of diseases such as Transmissible Gastroenteritis Virus (TGE), tuberculosis, and coccidiosis to livestock has been linked to migratory flocks of starlings and blackbirds. Estimates of the dollar value of this type of damage are not available. A consulting veterinarian for a large cattle feeding facility in Texas indicated problems associated with coccidiosis declined following reduction of starling and blackbird numbers using the facility (R. Smith, USDA/APHIS/WS, pers. comm. 2006).

Diseases associated with starlings, blackbirds, pigeons, and sparrows are summarized in Table 1-3. The table also summarizes types of livestock affected, typical symptoms and comments regarding implications for the listed diseases.

Table 1-3. Livestock Diseases That Have Been Linked To Rock Pigeons, European Starlings, Blackbirds, And/Or House Sparrows (Weber 1979).

Disease	Livestock affected	Symptoms	Comments
Bacterial:			
erysipeloid	cattle, swine, horses, sheep, goats, chickens, turkeys, ducks	Pigs - arthritis, skin lesions, necrosis, septicemia Sheep - lameness	serious hazard for the swine industry, rejection of swine meat at slaughter due to speticemia, also affects dogs
salmonellosis	all domestic animals	abortions in mature cattle, mortality in calves, decrease in milk production in dairy cattle Colitis in pigs,	over 1700 serotypes
Pasteurellosis	cattle, swine, horses, rabbits, chickens, turkeys	Chickens and turkeys die suddenly without illness pneumonia, bovine mastitis, abortions in swine, septicemia, abscesses	also affects cats and dogs
avian tuberculosis	chickens, turkeys, swine, cattle, horses, sheep	Emaciation, decrease in egg production, and death in poultry. Mastitis in cattle	also affects dogs and cats
Streptococcosis	cattle, swine, sheep, horses, chickens, turkeys, geese, ducks, rabbits	Emaciation and death in poultry. Mastitis in cattle, abscesses and inflammation of the heart , and death in swine	feral pigeons are susceptible and aid in transmission
yersinosis	cattle, sheep, goats, horses, turkeys, chickens, ducks	abortion in sheep and cattle	also affects dogs and cats
vibriosis	cattle and sheep	In cattle, often a cause of infertility or early embryonic death. In sheep, the only known cause of infectious abortion in late pregnancy	of great economic importance
Listeriosis	Chickens, ducks, geese, cattle, horses, swine, sheep, goats	In cattle, sheep, and goats, difficulty swallowing, nasal discharge, paralysis of throat and facial muscles	also affects cats and dogs
Viral:			
meningitis	cattle, sheep, swine, poultry	inflammation of the brain, newborn calves unable to suckle	associated with listeriosis, salmonellosis, cryptococcosis
encephalitis (7 forms)	horses, turkeys, ducks	drowsiness, inflammation of the brain	mosquitoes serve as vectors
Mycotic (fungal):			
aspergillosis	cattle, chickens, turkeys, and ducks	abortions in cattle	common in turkey poults
blastomycosis	weight loss, fever, cough,	Rarely	affects horses, dogs and cats

	bloody sputum and chest pains.		
candidiasis	cattle, swine, sheep, horses, chickens, turkeys	In cattle, mastitis, diarrhea, vaginal discharge, and aborted fetuses	causes unsatisfactory growth in chickens
cryptococcosis	cattle, swine, horses	chronic mastitis in cattle, decreased milk flow and appetite loss	also affects dogs and cats
histoplasmosis	horses cattle and swine	(in dogs) chronic cough, loss of appetite, weakness, depression, diarrhea, extreme weight loss	also affects dogs; actively grows and multiplies in soil and remains active long after birds have departed
Coccidiosis	poultry, cattle, and sheep	bloody diarrhea in chickens, dehydration, retardation of growth	almost always present in House sparrows; also found in pigeons and European Starlings
Protozoal:			
American trypanosomiasis	infection of mucous membranes of eyes or nose, swelling	possible death in 2-4 weeks	caused by the conenose bug found on pigeons
toxoplasmosis	cattle, swine, horses, sheep, chickens, turkeys	In cattle, muscular tremors, coughing, sneezing, nasal discharge, frothing at the mouth, prostration and abortion	also affects dogs and cats
Rickettsial/Chlamydial:			
chlamydiosis	cattle, horses, swine, sheep, goats, chickens, turkeys, ducks, geese	In cattle, abortion, arthritis, conjunctivitis, enteritis	also affects dogs and cats and many wild birds and mammals
Q fever	affects cattle, sheep, goats, and poultry	may cause abortions in sheep and goats	can be transmitted by infected ticks

Scope of Bird Damage to Agricultural Crops. Agricultural crops accounted for 18% of the cash receipts from farm commodities in Alabama in 2002. Principal crops grown in the state are cotton, corn, soybeans, peanuts, and wheat. Alabama ranks in the top five states on average for pecan and improved pecan production. Alabama's greenhouse and nursery industry produced 7% of the agricultural receipts in Alabama in 2004. The Alabama peach industry brought in just over $5 million in 2000 (Alabama Agricultural Statistics 2002).

Several studies have shown that blackbirds and European Starlings can pose a great economic threat to agricultural producers (Besser et. al. 1968, Dolbeer et.al. 1978, Feare 1984). Fruit or nut crops, especially pecans, can be severely damaged by blackbirds and American Crows. Bird damage to crops, such as corn, grain and sunflower has occasionally been identified as a problem in the State.

1.2.5 Need for Bird Damage Management to Protect Property

Birds frequently damage structures on private property, or public facilities, with fecal contamination. Accumulated bird droppings can reduce the functional life of some building roofs by 50% (Weber 1979). Corrosion damage to metal structures and painted finishes, including those on automobiles, can occur because of uric acid from bird droppings. Electrical utility companies frequently have problems with birds and bird droppings causing power outages by shorting out transformers and substations. This has resulted in hundreds of thousands of dollars of outage time for power companies. In addition to causing power outages noted above, property damage from Black Vultures

can include tearing and consuming latex window caulking or rubber gaskets sealing window panes, asphalt and cedar roof shingles, vinyl seat covers from boats, patio furniture, and ATV seats (F. Boyd, USDA/APHIS/WS, pers. comm. 2007). Black and Turkey vultures also cause damage to cell phone and radio towers by roosting on critical tower infrastructure. Persons and businesses concerned about these types of damage may request WS' assistance.

Pigeons, starlings, and sparrows can cause economic damage to aircraft in hangars. Accumulations of fecal droppings on planes, helicopters, maintenance equipment, and hangar floors result in unscheduled maintenance to clean planes and buildings to protect painted surfaces from acidic fecal droppings and maintain a sanitary work environment. Furthermore, birds may build nests in engines of idle aircraft which may cause engine damage or cause a fire.

Damage to property by crows, starlings, blackbirds, pigeons, vultures, and sparrows reported to WS by the public during FY 1993 to 2004 averaged $242,983 per year in Alabama. In addition, in FY 2005 and FY 2006, damage estimates from these species totaled $123,650.

In most such situations, BDM is requested because the mess associated with droppings left by concentrations of birds is aesthetically displeasing and can result in continual clean-up costs. Under the proposed action, WS could assist in resolving these types of problems.

1.2.6 Need For Bird Damage Management to Protect Wildlife, Including T&E Species

Some of the species listed as threatened or endangered under the Endangered Species Act of 1973 (ESA) are preyed upon or otherwise adversely affected by certain bird species. For instance, brood parasitism by Brown-headed Cowbirds has become a concern for many wildlife professionals where these birds are plentiful. Inter-specific nest competition has been well documented in Brown-headed Cowbirds, which are known to parasitize the nests of at least 158 avian species (Friedman 1929).

Interspecific nest competition has been well documented in European Starlings. Miller (1975) and Barnes (1991) reported European Starlings were responsible for a severe depletion of the Eastern Bluebird (*Sialis sialis*) population due to nest competition. Nest competition by European Starlings has also been known to adversely impact American Kestrels (*Falco sparverius)* (Von Jarchow 1943, Nickell 1967, Wilmer 1987), Red-bellied Woodpeckers (*Centurus carolinus*), Gila Woodpeckers (Centurus uropygialis) (Kerpez et al. 1990, Ingold 1994), and Wood Ducks (*Aix sponsa*) (Shake 1967, McGilvery and Uhler 1971, Heusmann et al. 1977, Grabill 1977). Weitzel (1988) reported nine native species of birds in Nevada had been displaced by starling nest competition, and Mason et al. (1972) reported European Starlings evicting bats from nest holes.

There are currently 98 species of animals and 18 species of plants federally listed as endangered or threatened in Alabama. Requests for assistance to alleviate predation by avian predators on several federally listed species could occur in Alabama. The feeding habits of the American Crow and Black Vultures could potentially lead to requests for assistance to alleviate predation on threatened and endangered species in Alabama.

1.3 RELATIONSHIP TO OTHER ENVIRONMENTAL DOCUMENTS

ADC Programmatic Final Environmental Impact Statement. WS has issued a FEIS on the national WS' program (USDA 1997). Pertinent and current information available in the FEIS has been incorporated by reference into this EA.

1.4 DECISION TO BE MADE

Based on the scope of this EA, the decisions to be made are:

- Should WS continue to implement an IWDM strategy, including non-lethal and lethal methods, to meet the need for bird damage management in Alabama?
- If not, should WS attempt to implement one of the alternatives to an IWDM strategy as described in the EA?
- Would the proposed action have significant impacts on the quality of the human environment, requiring preparation of an Environmental Impact Statement (EIS)?

1.5 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

1.5.1 Actions Analyzed

This EA evaluates bird damage management by WS to protect human health and safety, agricultural crops, livestock, livestock health, property, threatened and endangered species, and other wildlife or natural resources on federal, state, tribal, municipal and private land within the State of Alabama wherever such management is requested by a cooperator.

1.5.2 Native American Lands and Tribes

Currently, WS in Alabama does not have a Memorandum of Understanding (MOU) or agreements with any Native American tribe. If WS enters into an agreement with a tribe for BDM, this EA would be reviewed and supplemented if appropriate to insure compliance with NEPA. MOUs, agreements and NEPA compliance would be conducted as appropriate before conducting BDM on tribal lands.

1.5.3 Period for which this EA is Valid

This EA will remain valid until WS and cooperating agencies determines that new needs for action or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document will be reviewed and revised as necessary. Review of the EA will occur annually to ensure the BDM program implemented remains within the scope of analysis contained in this EA.

1.5.4 Site Specificity

This EA analyzes the potential impacts of BDM and addresses activities on all lands in Alabama. Activities would only be conduct at the request of a cooperator and only under a MOU, Cooperative Service Agreement, or other comparable agreement. It also addresses the impacts of BDM on areas where additional agreements may be signed in the future. WS' mission is to provide service to cooperators requesting assistance with BDM and therefore, additional BDM efforts could occur beyond those damage situations encountered during the current program. Thus, this EA anticipates this potential expansion and analyzes the impacts of such efforts as part of the program.

Planning for the management of bird damage must be viewed as being conceptually similar to federal or other agency actions whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where they will occur are unknown but could be anywhere in a defined geographic area. Examples of such agencies and programs include fire departments, police departments, and emergency clean-up organizations. Although some of the sites where bird damage will occur can be predicted, all specific locations or times where such damage will

occur in any given year cannot be predicted. This EA emphasizes major issues as they relate to specific areas whenever possible, however, many issues apply wherever bird damage and resulting management occurs, and are treated as such. The standard WS' Decision Model (Slate et al. 1992) would be the site-specific procedure for individual actions conducted by WS in Alabama (see Chapter 3 for a description of the Decision Model and its application).

The analyses in this EA are intended to apply to any action that may occur *in any locale* and at *any time* within Alabama. In this way, WS believes it meets the intent of NEPA with regard to site-specific analysis and that this is the only practical way for WS to comply with NEPA and still be able to accomplish its mission.

1.5.5 Summary of Public Involvement

Issues related to the proposed action were initially developed by WS and cooperating agencies. Issues were defined and preliminary alternatives were identified. As part of this process, and as required by the Council on Environmental Quality (CEQ) and APHIS' NEPA implementing regulations, this document and its Decision are being made available to the public through Notices of Availability (NOA) published in local media and through direct mailings of NOA to parties that have specifically requested to be notified. New issues or alternatives raised after publication of public notices will be fully considered to determine whether the EA and its Decision should be revisited and, if appropriate, revised.

1.6 AUTHORITY AND COMPLIANCE

1.6.1 Authority of Federal and State Agencies in Bird Damage Management in Alabama[5]

1.6.1.1 Wildlife Services' Legislative Authority

The USDA is directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for the Wildlife Services program is the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c), which provides that:

> *"The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2001."*

Since 1931, with the changes in societal values, WS' policies and its programs place greater emphasis on the part of the Act discussing "*bringing (damage) under control*", rather than "*eradication*" and "*suppression*" of wildlife populations. In 1988, Congress strengthened the legislative directive and authority of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. This Act states, in part:

> *"That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and*

[5] See Chapter 1 of WS' FEIS (USDA 1997) for a complete discussion of federal laws affecting WS' damage management activities.

institutions in the control of nuisance mammals and birds and those mammals and birds species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities".

1.6.1.2 U.S. Fish and Wildlife Service (USFWS)

The USFWS is responsible for managing and regulating take of bird species that are listed as migratory under the Migratory Bird Treaty Act (MBTA), and those that are listed as threatened or endangered under the Endangered Species Act. The USFWS authority for action is based on the MBTA of 1918 (as amended), which implements treaties with the United States, Great Britain (for Canada), the United Mexican States, Japan, and the former Soviet Union. Section 3 of this Act authorized the Secretary of Agriculture:

"From time to time, having due regard to the zones of temperature and distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, to determine when, to what extent, if at all, and by what means, it is compatible with the terms of the convention to allow hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any such bird, or any part, nest, or egg thereof, and to adopt suitable regulations permitting and governing the same, in accordance with such determinations, which regulations shall become effective when approved by the President."

The authority of the Secretary of Agriculture, with respect to the Migratory Bird Treaty, was transferred to the Secretary of the Interior in 1939 pursuant to Reorganization Plan No. II. Section 4(f), 4 Fed. Reg. 2731, 53 Stat. 1433.

CFR 50 Subchapter C - The National Wildlife Refuge System - Part 30 - Feral Animals - Subpart B-30.11 - Control of feral animals states: (a) Feral animals, including horses, burros, cattle, swine, sheep, goats, reindeer, dogs, and cats, without ownership that have reverted to the wild from a domestic state may be taken by authorized federal or state personnel or by private persons operating under permit in accordance with applicable provisions of federal or state law or regulation.

The USFWS is also responsible for the protection and management of those populations, species, and subspecies that are considered threatened or endangered under the ESA.

1.6.1.3 Alabama Department of Conservation and Natural Resources, Wildlife and Freshwater Fisheries Division

The mission of the Wildlife and Freshwater Fisheries Division is to manage, protect, conserve, and enhance the wildlife and aquatic resources of Alabama for the sustainable benefit of the people of Alabama.

1.6.1.4 Alabama Department of Agriculture and Industries

The mission of the Alabama Department of Agriculture and Industries is to provide timely, fair and expert regulatory control over product, business entities, movement, and application of goods and services for which applicable State and Federal laws exist and strives to protect and provide service to Alabama consumers. Department personnel will actively work to initiate and support economic development activities and promote domestic and international consumption of

Alabama products. It is the Department's goal to be recognized for its employee's integrity and professional performance. The Pesticide Division enforces state laws pertaining to the use and application of pesticides.

1.6.1.5 Tennessee Valley Authority (TVA)

TVA is a federal corporation created by an Act of Congress on May 18, 1933 [48 Stat.58-59, 16 U.S.C. Sec. 831, as amended], which provides electrical power to 8.3 million people, businesses, and industries and manages 293,000 acres of public land and 11,000 miles of reservoir shoreline in the 7-state Tennessee Valley region. Largely in Tennessee, TVA's plants and facilities include 11 coal-burning and 6 combustion-turbine plants, 3 nuclear plants, 29 dams and 1 pump-storage plant, as well as 15 solar and other renewable energy production sites. The electricity TVA generates is transmitted over 17,000 miles of transmission line right-of-way easements across the Valley. TVA contracts with WS to provide nuisance wildlife damage management on its land and at its facilities located throughout Alabama.

1.6.2 Compliance with Other Federal Statutes

Several other Federal laws authorize, regulate, or otherwise affect WS' wildlife damage management in Alabama. WS complies with these laws and consults and cooperates with other agencies as appropriate.

1.6.2.1 National Environmental Policy Act (NEPA)

Environmental documents pursuant to NEPA must be completed before operational activities consistent with the NEPA decision can be implemented. This EA meets the procedural NEPA requirement for the proposed action in Alabama. When WS' is requested by another federal agency to conduct damage management, NEPA compliance is the responsibility of the requesting federal agency. However, WS could agree to complete NEPA documentation at the request of the other federal agency.

1.6.2.2 Endangered Species Act (ESA)

Under the ESA, all federal agencies must seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act (Sec. 2(c)). WS conducts Section 7 consultations with the USFWS to ensure that "*any action authorized, funded or carried out by such an agency. . . is not likely to jeopardize the continued existence of any endangered or threatened species. . . each agency shall use the best scientific and commercial data available*" (Sec. 7(a)(2)). WS obtained a Biological Opinion (BO) from the U.S. Fish and Wildlife Service describing potential effects on T&E species from programmatic activities. The BO prescribes reasonable and prudent measures for avoiding jeopardy (USDA 1997, see Appendix F).

1.6.2.3 Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711; 40 Stat. 755), as Amended

The Migratory Bird Treaty Act (MBTA) provides the USFWS regulatory authority to protect families of migratory birds. The law prohibits any "*take*" of migratory bird species by any entities, except as permitted by the USFWS. Under permitting guidelines in the Act, the USFWS may issue permits to requesters experiencing damage caused by bird species protected under the Act. All actions conducted in this EA will be in compliance with the regulations of the MBTA, as amended.

The law was further clarified to include only those birds considered migratory and native to the U.S. by the Migratory Bird Treaty Reform Act of 2004. Under the Reform Act, the USFWS published a list of bird species not protected under the MBTA (70 FR 12710-12716). Under the Reform Act, European Starlings, House Sparrows, and Rock Pigeons are considered non-native to the U.S. and are not protected under the MBTA. A permit from the USFWS for "*take*" of European Starlings, House Sparrows, and Rock Pigeons is not required.

A depredation order exists under the MBTA for blackbirds, cowbirds, grackles, crows and magpies when those species are "*found committing or about to commit depredations upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance*" whereby, a permit from the USFWS is not necessary for "*take*" to occur of those species under conditions listed (50 CFR 21.43).

1.6.2.4 Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The Environmental Protection Agency (EPA) is responsible for implementing and enforcing FIFRA. All chemical methods integrated into the WS' program in Alabama are registered with and regulated by the EPA and the Alabama Department of Agriculture and Industries, Pesticide Management Division, and used by WS in compliance with labeling procedures and requirements.

1.6.2.5 Investigational New Animal Drug (INAD)

The drug alpha-chloralose (AC) has been used as a sedative for animals and is registered with the Food and Drug Administration (FDA) to capture waterfowl, coots, and pigeons. FDA approval for use under INAD (21 CFR 511) authorized WS to use the drug as a non-lethal form of capture.

1.6.2.6 Executive Order 13112 of February 3, 1999 – Invasive Species

Executive Order 13112 states that each Federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law; 1) reduce invasion of exotic species and the associated damages, 2) monitor invasive species populations, provide for restoration of native species and habitats, 3) conduct research on invasive species and develop technologies to prevent introduction, and 4) provide for environmentally sound control and promote public education on invasive species.

1.6.2.7 Executive Order 13186 of January 10, 2001 - "Responsibilities of Federal Agencies to Protect Migratory Birds"

Executive Order 13186 directs federal agencies to protect migratory birds and strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and minimize the take of migratory birds. A National-level MOU between the USFWS and WS is being developed to facilitate the implementation of Executive Order 13186.

1.6.2.8 Executive Order 12898 of February 11, 1994 – "Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations"

Executive Order 12898, promotes the fair treatment of people of all races, income levels and cultures with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Environmental justice is the pursuant of equal justice and protection

under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. Environmental Justice is a priority within APHIS and WS. Executive Order 12898 requires Federal agencies to make environmental justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies and activities on minority and low-income persons or populations. APHIS implements Executive Order 12898 principally through its compliance with NEPA. All WS' activities are evaluated for their impact on the human environment and compliance with Executive Order 12898. WS' personnel use only legal, effective, and environmentally safe wildlife damage management methods, tools, and approaches. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations. In contrast, the proposed action may benefit minority or low-income populations by reducing bird damage such as threats to public health and safety.

1.6.2.9 Executive Order 13045 of April 21, 1997 – "Protection of Children from Environmental Health Risks and Safety Risks"

Children may suffer disproportionately from environmental health and safety risks, including the development of their physical and mental status. Because WS makes it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children, WS has considered the impacts that alternative analyzed might have on children. A Risk Assessment (USDA 1997) concluded that when non-chemical and chemical methods are used according to label directions and in compliance with normally accepted safety practices and WS' SOPs, such use has negligible impacts on the environment or on human health and safety, including the health and safety of children.

1.6.2.10 Occupational Safety and Health Act of 1970

The Occupational Safety and Health Act of 1970 and its implementing regulations (29 CFR 1910) on sanitation standards states that "*Every enclosed workplace shall be so constructed, equipped, and maintained, so far as reasonably practical, as to prevent the entrance or harborage of rodents, insects, and other vermin. A continuing and effective extermination program shall be instituted where their presence is detected*". This standard includes birds that may cause safety and health concerns at workplaces.

1.6.2.11 The Native American Graves and Repatriation Act of 1990

The Native American Graves Protection and Repatriation Act requires Federal agencies to notify the Secretary of the Department that manages the Federal lands upon the discovery of Native American cultural items on Federal or tribal lands. Federal projects would discontinue work until a reasonable effort has been made to protect the items and the proper authority has been notified.

1.6.2.12 National Historic Preservation Act (NHPA) of 1966, as amended

The NHPA of 1966, and its implementing regulations (36 CFR 800), requires federal agencies to: 1) determine whether activities they propose constitute "undertakings" that have the potential to cause effects on historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the Advisory Council on Historic Preservation (i.e. State Historic Preservation Office, Tribal Historic Preservation Officers), as appropriate. WS' actions on tribal lands are only conducted at the tribe's request and under signed agreement; thus, the tribes have control over any potential conflict with cultural resources on tribal properties.

Each of the BDM methods described in Appendix B that might be used operationally by WS do not cause major ground disturbance, do not cause any physical destruction or damage to property, do not cause any alterations of property, wildlife habitat, or landscapes, and do not involve the sale, lease, or transfer of ownership of any property. In general, such methods also do not have the potential to introduce visual, atmospheric, or audible elements to areas in which they are used that could result in effects on the character or use of historic properties. Therefore, the methods that would be used by WS under the proposed action are not generally the types of activities that would have the potential to affect historic properties. If an individual activity with the potential to affect historic resources is planned under an alternative selected as a result of a decision on this EA, then site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary.

There is potential for audible effects on the use and enjoyment of a historic property when methods such as propane exploders, pyrotechnics, firearms, or other noise-making methods are used at or in close proximity to such sites for purposes of hazing or removing nuisance birds or other wildlife. However, such methods would only be used at a historic site at the request of the owner or manager of the site to resolve a damage or nuisance problem, which means such use would be to benefit the historic property. A built-in mitigating factor for this issue is that virtually all of the methods involved would only have temporary effects on the audible nature of a site and can be ended at any time to restore the audible qualities of such sites to their original condition with no further adverse effects. Site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary in those types of situations.

1.7 PROPOSED ACTION

WS proposes to continue the current Rock Pigeon, Mourning Dove, Black Vulture, Turkey Vulture, European Starling, House Sparrow, Red-winged Blackbird, Brown-headed Cowbird, Common Grackle and American Crow damage management program in the State of Alabama. An Integrated Wildlife Damage Management (IWDM) approach would be implemented to reduce damage activities to property, agricultural and natural resources, livestock, and public health and safety. Damage management would be conducted on property in Alabama when the resource owner (property owner) or manager requests assistance. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment.

Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS' Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification or harassment would be recommended and utilized to reduce damage. In other situations, birds would be removed as humanely as possible using shooting, trapping, and EPA registered pesticides. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. Bird damage management activities would be conducted in the State, when requested and funded, on private or public property, including airport facilities and adjacent or nearby properties, after an MOU, Cooperative Service Agreement, or other comparable document has been completed. All management activities would comply with appropriate federal, state, and local laws.

1.8 PREVIEW OF THE REMAINDER OF THIS EA

The remainder of this EA is composed of four (4) chapters and four (4) appendices. Chapter 2 discusses and analyzes the issues and affected environment. Chapter 3 contains a description of each alternative, alternatives not considered in detail, and standard operating procedures (SOP). Chapter 4 analyzes environmental consequences and the environmental impacts associated with each alternative considered in detail. Chapter 5 contains the list of preparers of this EA. Appendix A is the literature cited used during the preparation of the EA, Appendix B is a detailed description of the methods used for BDM, Appendix C contains the list of threatened and endangered species that are federally listed in Alabama.

CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT

2.0 INTRODUCTION

Chapter 2 contains a discussion of the issues, including issues that will receive detailed environmental effects analysis in Chapter 4 (Environmental Consequences), issues that have driven the development of standard operating procedures, and issues that will not be considered in detail, with rationale. Pertinent portions of the affected environment will be included in this chapter in the discussion of issues used to develop standard operating procedures. Additional affected environments analyses are incorporated into the discussion of the environmental impacts in Chapter 4 and the description of the proposed program in Chapter 3.

Issues are concerns of the public and/or professional communities about potential environmental problems that might occur from a proposed federal action. Such issues must be considered in the NEPA decision process. Issues relating to the management of wildlife damage were raised during the scoping process in preparing the programmatic ADC FEIS (USDA 1997) and were considered in the preparation of this EA. These issues are fully evaluated within the FEIS, which analyzed data specific to the WS' program in Alabama.

2.1 AFFECTED ENVIRONMENT

Upon request for assistance, BDM activities could be conducted on federal, state, tribal, municipal, and private properties in Alabama. Assistance requests to resolve bird damage could occur, but is not necessarily limited to, areas in and around buildings and parks; bridges; industrial sites; urban/suburban woodlots; hydro-electric dam structures; reservations and reservoir shore lands; nuclear, hydro and fossil power plant sites; substations; transmission line rights-of-way; on ship fleets; or at any other sites where birds may roost, loaf, or nest. Damage management activities could be conducted at agricultural fields, vineyards, orchards, farmyards, dairies, ranches, livestock operations, grain mills, and grain handling areas (e.g. railroad yards) where birds destroy crops, feed on spilled grains, or contaminate food products for human or livestock consumption. Additionally, BDM activities could be conducted at airports and surrounding properties where birds represent a threat to aviation safety.

2.1.1 *The "Environmental Status Quo" for managing damage and conflicts associated with State managed or unprotected wildlife species.*

As defined by NEPA implementing regulations, the "*human environment* shall be interpreted comprehensively to include the natural and physical environment *and the relationship of people with that environment*." (40 CFR 1508.14). Therefore, when a federal action agency analyzes its potential impacts on the "human environment," it is reasonable for that agency to compare not only the effects of the federal action, but also the potential impacts that occur or will occur in the absence of the federal action. This concept is applicable to situations involving federal assistance in managing damage associated with state-resident wildlife species or unprotected wildlife species.

Unprotected wildlife species, such as most non-native invasive species, are not protected under state or federal law. Most resident wildlife species are managed under State authority or law without any federal oversight or protection. In some states, with the possible exception of restrictions on methods (e.g., firearms restrictions, pesticide regulations), unprotected wildlife species and certain resident wildlife species are managed with little or no restrictions allowing them to be killed or taken by anyone at any time.

When a non-federal entity takes a management action on a State-resident wildlife species or unprotected wildlife species, the action is not subject to NEPA compliance due to the lack of federal involvement in the action. Under such circumstances, the environmental *baseline* or *status quo* must

be viewed as an environment that includes those species *as they are managed or impacted by non-federal entities in the absence of the federal action being proposed*. Therefore, in those situations in which a non-federal entity has decided that a management action directed towards a state protected or unprotected wildlife species will occur and is committed to take action using methods available, WS' involvement in the action will not affect the *environmental status quo* since most methods available to WS are also available to other entities. WS' decision-making ability is restricted to one of two alternatives - either taking the action using the specific methods as decided upon by the non-federal entity, or taking no action at all at which point the non-federal entity will take the same action anyway.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage bird damage with or without WS' assistance, WS' participation in carrying out the action will not affect the *environmental status quo*. In some situations, however, certain aspects of the human environment may actually benefit more from WS' involvement than from a decision not to assist. For example, if a cooperator believes WS has greater expertise to selectively remove a target species than a non-WS entity; WS' management activities may have less of an impact on target and non-target species than if the non-federal entity conducted the action alone. Thus, in those situations, WS' involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

2.2 ISSUES ANALYZED IN DETAIL IN CHAPTER 4

The following issues have been identified as areas of concern requiring consideration in this EA. These will be analyzed in detail in Chapter 4:

- Effects on target bird species
- Effects on other wildlife species, including T&E species
- Effects on human health and safety
- Impacts to stakeholders, including aesthetics
- Humaneness and animal welfare concerns of methods used

2.2.1 Effects on Target Bird Species

A common concern among members of the public is whether wildlife damage management actions adversely affect the viability of target species populations. The target species selected for analysis in this EA are Rock Pigeons, Mourning Dove, Black Vulture, Turkey Vulture, European Starlings, House Sparrows, Red-winged Blackbirds, Brown-headed Cowbirds, Common Grackles, and American Crows.

2.2.1.1 Impacts of West Nile virus on bird populations

West Nile (WN) virus has emerged in recent years in temperate regions of North America, with the first documented appearance of the virus in North America occurring in New York City in 1999 (MMWR 2002, Rappole et al. 2000). Since 1999, the virus has spread across the United States and has been reported to occur in all states except Hawaii and Alaska (CDC 2006). West Nile virus is typically transmitted between birds and mosquitoes. Mammals can become infected if bitten by an infected mosquito, but individuals in most species of mammals do not become ill from the virus. The most serious manifestation of the WN virus is fatal encephalitis in humans, horses, and birds.

West Nile virus has been detected in dead birds of at least 285 species, including starlings, sparrows, doves, pigeons and blackbirds (CDC 2005). In some bird species, particularly corvids

(crows, blue jays, ravens, magpies), the virus causes disease (often fatal) in a large percentage of infected birds (2005, Cornell University 2003, MMWR 2002). In 2002, WN virus surveillance/monitoring programs revealed that corvids accounted for 90% of the dead birds reported with crows representing the highest rate of infection (MMWR 2002). Large birds that live and die near humans (i.e. crows) have a greater likelihood of being discovered, therefore the reporting rates tend to be higher for these bird species and are a good indicator species for the presence of WN virus in a specific area (Cornell University 2003, National Audubon Society 2005).

According to the U.S. Geological Survey (USGS) (2003), it is not unusual for a new disease to cause high rates of infection or death because birds do not have the natural immunity to the infection. Furthermore, it is not known how long it will take for specific bird population to develop sufficient immunity to the virus. Surveys of wild birds completed in the last three years have shown that some birds have already acquired antibodies to the virus (USGS 2003). Based upon available Christmas Bird Counts and Breeding Bird Surveys, the USGS (2003) states that there have been declines in observations of many local bird populations, however they do not know if the decline can be attributed to WN virus or to some other cause. A review of available crow population data by the National Audubon Society (2005) reveals that at least some local crow populations are suffering high WN virus related mortality, but crow numbers do not appear to be declining drastically across broad geographic areas. The USGS does not anticipate that the commonly seen species, such as crows and blue jays, will be adversely affected by the virus to the point that these bird species will disappear from the U.S. (USGS 2003).

2.2.2 Effects on Other Wildlife Species, Including T&E Species.

A common concern among members of the public and wildlife professionals, including WS' personnel, is whether the proposed action or any of the alternatives might result in adverse impacts to populations of other wildlife, particularly T&E species. WS' SOPs are designed to reduce the effects on non-target species' populations and are presented in Chapter 3. To reduce the risks of adverse affects to non-target species, WS would select damage management methods that are target-selective or apply such methods in ways to reduce the likelihood of capturing or killing non-target species.

Special efforts are made to avoid jeopardizing threatened and endangered species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. WS has consulted with the USFWS under Section 7 of the ESA concerning potential effects of BDM methods on T&E species and has obtained a BO. For the full context of the BO, see Appendix F of the ADC FEIS (USDA 1997). WS is also in the process of reinitiating Section 7 consultation at the program level to assure that potential effects on T&E species have been adequately addressed.

Some members of the public are concerned that the use of registered toxicants to reduce bird damage would have adverse impacts on other wildlife species, including T&E species. Under the alternatives proposed in this EA, the primary toxicant proposed for use by WS is DRC-1339, which would be used to remove pigeons, blackbirds, crows, and/or starlings in damage situations. Another chemical method that could be used is Avitrol. Avitrol is classified as an avian distressing agent and is normally used to deter target bird species from using certain problem areas. Other chemicals available for use include the tranquilizer alpha-chloralose (for live-capturing pigeons), anthraquinone (Flight Control), and methyl and di-methyl anthranilate (artificial grape flavoring, which also has bird repellent capabilities). See Appendix B for detailed description of these chemicals and their potential effects.

2.2.3 Effects on Human Health and Safety

2.2.3.1 Safety and Efficacy of Chemical Control Methods.

Some members of the public are concerned about chemicals that are used in bird control programs because of potential adverse effects on people from being exposed either directly to the chemicals or to birds that have died as a result of chemical use. Under the alternatives proposed in this EA, the primary toxicant proposed for use by WS is DRC-1339 (Starlicide), which would be used to remove pigeons, starlings, crows, or blackbirds in damage situations. DRC-1339 use is regulated by the EPA through FIFRA, by the Alabama Department of Agriculture and Industries, Pesticide Management Division, and by WS' Directives. Another chemical method that could be used is Avitrol. Avitrol is classified as an avian distressing agent and is normally used to deter target bird species from using certain problem areas. Other chemicals available for use include the tranquilizer alpha-chloralose (for live-capturing pigeons) anthraquinone (Flight Control), and methyl and di-methyl anthranilate (artificial grape flavoring, which also has bird repellent capabilities).

The use of registered chemical toxicants and repellants by WS for BDM poses no probable risk to public health and safety, according to WS' Final Environmental Impact Statement (USDA 1997, Appendix P). WS' personnel who apply pesticides are certified restricted use pesticide applicators and apply pesticides according to label instructions. See Appendix B for detailed description of these chemicals and their potential effects.

2.2.3.2 Effects on Human Health and Safety from Non-Chemical BDM Methods.

Some people may be concerned that WS' use of firearms, traps, and pyrotechnic scaring devices could cause injuries to people. WS' personnel occasionally use traps, rifles, air rifles, and shotguns to remove birds that are causing damage. There is some potential fire hazard to agricultural sites and private property from pyrotechnic use.

Firearm use is a very sensitive public concern because of safety relating to the public and potential misuse. To ensure safe use and awareness, WS' employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS' employees who carry firearms as a condition of employment are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment*, which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

2.2.3.3 Impacts on Human Health and Safety from Birds

The concern stated here is that the absence of adequate BDM would result in adverse effects on human health and safety, because bird damage would not be curtailed or reduced to the minimum levels possible and practical. The potential impacts of not conducting such work could lead to increased incidence of injuries, illness, or loss of human lives.

The absence of BDM in Alabama could result in adverse effects on human health and safety because of the transmission of bird-borne diseases and increases in bird strikes on aircraft. Sites where roosting birds, such as European Starlings, blackbirds, and pigeons have deposited considerable quantities of droppings are viewed as aesthetically displeasing. In addition, such locations are likely to harbor infective levels of *Histoplasma capsulatum*, posing a threat of

disease to humans (Stickley and Weeks 1985) or *Cryptococcus neoformans* (U.S. Environmental Hygiene Agency 1992), as discussed in Subsection 1.1.2.

As discussed in Subsection 1.1.3, WS frequently assists airports in Alabama who seek to resolve wildlife hazards to air passengers. Airport managers, military wing safety crews, and air safety officials are concerned that the absence of a BDM program could lead to an increased incidence of injuries or loss of human lives from bird strikes to aircraft.

2.2.4 Impacts to Stakeholders, Including Aesthetics

The human attraction to animals has been well documented throughout history and began when humans first domesticating animals. The American public is no exception and today a large percentage of households have pets. However, some people may consider individual wild animals and birds as pets or exhibit affection toward these animals, especially people who enjoy viewing wildlife. Therefore, the public reaction is variable and mixed to wildlife damage management because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to reduce conflicts/problems between humans and wildlife.

There is some concern that the proposed action or the alternatives would result in the loss of aesthetic benefits to the public, resource owners, or neighboring residents. Wildlife generally is regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987), and the mere knowledge that wildlife exists is a positive benefit to many people. Aesthetics is the philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is truly subjective in nature, dependent on what an observer regards as beautiful.

Wildlife populations provide a range of social and economic benefits (Decker and Goff 1987). These include direct benefits related to consumptive and non-consumptive use (e.g., wildlife-related recreation, observation, harvest, sale), indirect benefits derived from vicarious wildlife related experiences (e.g., reading, television viewing), and the personal enjoyment of knowing wildlife exists and contributes to the stability of natural ecosystems (e.g., ecological, existence, bequest values) (Bishop 1987). Direct benefits are derived from a user's personal relationship to animals and may take the form of direct consumptive use (using up the animal or intending to) or non-consumptive use (viewing the animal in nature or in a zoo, photography) (Decker and Goff 1987). Indirect benefits or indirect exercised values arise without the user being in direct contact with the animal and come from experiences such as looking at photographs and films of wildlife, reading about wildlife, or benefiting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Indirect benefits come in two forms: bequest and pure existence (Decker and Goff 1987). Bequest is providing for future generations and pure existence is merely knowledge that the animals exist (Decker and Goff 1987).

Many people directly affected by problems and threats to public health or safety caused by birds insist upon their removal from the property or public location when they cause damage. Some people believe that all wildlife should be captured and relocated to another area to alleviate damage or threats to public health or safety. Some people directly affected by the problems caused by wildlife strongly support removal. Individuals not directly affected by the harm or damage may be supportive, neutral, or totally opposed to any removal of wildlife from specific locations or sites. Some people totally opposed to BDM want WS to teach tolerance for damage and threats to public health or safety, and that wildlife should never be killed. Some people would strongly oppose removal of birds regardless of the amount of damage. Some of the people who oppose removal of wildlife do so because of human-affectionate bonds with individual wildlife. These human-affectionate bonds are similar to attitudes of a pet owner and result in aesthetic enjoyment.

Alabama WS only conducts wildlife damage management at the request of the affected home/property owner or resource manager. If WS received requests from an individual or official for BDM activities, WS would address the issues/concerns and consideration would be made to explain the reasons why the individual damage management actions would be necessary. Management actions would be carried out in a caring, humane, and professional manner.

2.2.5 Humaneness and Animal Welfare Concerns of Methods Used

The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important but very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate pest damage management for societal benefits could be compatible with animal welfare concerns, if *" . . . the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process."*

Suffering is described as a *" . . . highly unpleasant emotional response usually associated with pain and distress."* However, suffering *" . . . can occur without pain . . . ,* and *" . . . pain can occur without suffering . . .* (AVMA 1987). Because suffering carries with it the implication of a time frame, a case could be made for *" . . . little or no suffering where death comes immediately . . ."* (CDFG 1991), such as shooting.

Defining pain as a component in humaneness of WS' methods appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would *" . . . probably be causes for pain in other animals . . ."* (AVMA 1987). However, pain experienced by individual animals probably ranges from little or no pain to considerable pain (CDFG 1991).

Pain and suffering, as it relates to WS' damage management methods, has both a professional and lay point of arbitration. Wildlife managers and the public would be better served to recognize the complexity of defining suffering, since *" . . . neither medical or veterinary curricula explicitly address suffering or its relief"* (CDFG 1991).

Therefore, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of animal suffering within the constraints imposed by current technology and funding.

WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some BDM methods are used in situations where non-lethal damage management methods are not practical or effective.

Alabama WS' personnel are experienced and professional in their use of management methods using methods that are as humane as possible under the constraints of current technology, workforce and funding. SOPs used to maximize humaneness are listed in Chapter 3.

2.3 ISSUES CONSIDERED BUT NOT IN DETAIL WITH RATIONALE

2.3.1 Appropriateness of Preparing an EA (Instead of an EIS) For Such a Large Area

WS has the discretion to determine the geographic scope of their NEPA analyses (Kleppe v Sierra Club, 427 U.S. 390, 414 (1976), CEQ 1508.25). Ordinarily, according to APHIS procedures

implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions may be categorically excluded (7 CFR 372.5(c), 60 Fed. Reg. 6000-6003, 1995). The intent in developing this EA is to determine if the proposed action would potentially have significant individual and cumulative impacts on the quality of the human environment that would warrant the preparation of an EIS or a finding of no significant impact (FONSI). This EA addresses impacts for managing damage and threats to human safety caused by certain bird species in Alabama to analyze individual and cumulative impacts to provide thorough analyses.

In terms of considering cumulative effects, one EA analyzing impacts for the entire State of Alabama will provide a more comprehensive and less redundant analysis than multiple EA covering smaller areas. If a determination is made through this EA that the proposed action would have a significant impact on the quality of the human environment, then an EIS would be prepared.

2.3.2 WS' Effect on Biodiversity

The WS' program does not attempt to eradicate any species of wildlife in the State of Alabama. WS operates in accordance with international, federal and state laws, and regulations enacted to ensure species viability. The effects of the current WS' program on biodiversity are not significant nationwide or statewide (USDA 1997). In the case of local populations of non-native species such as European Starlings, House Sparrows and Rock Pigeons, the goal may be to reduce a local population but because such species are not native wildlife species, they are not an essential component of the native biodiversity. Rarely, if ever, would BDM result in the long term local reduction of even those non-native species.

2.3.3 Wildlife Damage is a Cost of Doing Business -- a Threshold of Loss Should Be Established Before Allowing Any Lethal Bird Damage Management

WS is aware that some people feel federal wildlife damage management should not be allowed until economic losses reach some arbitrary predetermined threshold level. Such policy, however, would be difficult or inappropriate to apply to human health and safety situations. Although some damage can be tolerated by most resource owners, WS has the legal direction to respond to requests for assistance, and it is program policy to aid each requester to minimize losses. WS uses the Decision Model thought process discussed in Chapter 3 to determine appropriate strategies.

In a ruling for Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie National Forest, et al., the United States District Court of Utah denied plaintiffs' motion for preliminary injunction. In part the court found that a forest supervisor needs only show that damage from wildlife is threatened, to establish a need for wildlife damage management (Civil No. 92-C-0052A January 20, 1993). Thus, there is judicial precedence indicating that it is not necessary to establish a criterion such as percentage of loss of a particular resource to justify the need for wildlife damage management actions.

2.3.4 Wildlife Damage Management Should Not Occur At Taxpayer Expense, but Should Be Fee Based

Funding for WS comes from a variety of sources in addition to federal appropriations. Cooperative funding sources could occur under an agreement for service from the State of Alabama, county, municipal, private, and other federal agencies. Federal, state, and local officials have decided that wildlife damage management should be conducted by appropriating funds. WS was established by Congress as the agency responsible for providing wildlife damage management to the people of the United States. Wildlife damage management is an appropriate sphere of activity for government

programs, since aspects of wildlife damage management are a government responsibility and authorized and directed by law.

A minimal Federal appropriation is allotted for the maintenance of a WS' program in Alabama. The remainder of the WS' program is entirely fee-based. Technical assistance is provided to requesters as part of the federally-funded activities, but all direct assistance in which WS' employees perform damage management activities is funded through cooperative agreements between the requester and WS. Thus, BDM by WS in Alabama is fee-based to a high degree.

2.3.5 Cost Effectiveness of Bird Damage Management

The Council on Environmental Quality (CEQ) does not require a formal, monetized cost benefit analysis to comply with NEPA. Consideration of this issue is not essential to making a reasoned choice among the alternative being considered. However, the methods determined to be most effective to reduce damage and threats to human safety caused by certain bird species and prove to be the most cost effective will receive the greatest application. Additionally, management operations may be constrained by cooperator funding and/or objectives and needs.

2.3.6 Bird Damage Should Be Managed By Private Nuisance Wildlife Control Agents

Private nuisance wildlife control agents could be contacted to reduce bird damage for property owners or property owners when deemed appropriate by the resource owner. Some property owners would prefer to use a private nuisance wildlife control agent because the nuisance wildlife agent is located in closer proximity and thus could provide the service at less expense, or because they prefer to use a private business rather than a government agency. However, some property owners would prefer to contract with a government agency. In particular, large industrial businesses and cities and towns may prefer to use WS because of security and safety issues and reduced administrative burden. Additionally, use of the pesticide DRC-1339 may be the most effective damage management method in some situations, either used alone or as part of an IWDM program. This avicide is registered for use by WS personnel only and is not available to private nuisance wildlife control agents or property owners. However, the restricted use pesticide, Starlicide, is similar to DRC-1339 and may be used by certified applicators.

CHAPTER 3: ALTERNATIVES

3.0 INTRODUCTION

The No Action alternative is a procedural NEPA requirement (40 CFR 1502), is a viable and reasonable alternative that could be selected, and serves as a baseline for comparison with the other alternatives. The No Action alternative, as defined here, is consistent with the Council on Environmental Quality's (CEQ) definition (CEQ 1981).

Alternatives analyzed in detail are:

- Alternative 1 - Integrated Bird Damage Management Program
- Alternative 2 - Non-lethal Bird Damage Management Only
- Alternative 3 - Technical Assistance Only
- Alternative 4 - No Federal WS' Bird Damage Management

3.1 DESCRIPTION OF THE ALTERNATIVES

3.1.1 Alternative 1 - Integrated Bird Damage Management Program (Proposed Action/No Action)

The proposed action is to continue the Rock Pigeon, Mourning Dove, Black Vulture, Turkey Vulture, European Starling, House Sparrow, Red-winged Blackbird, Brown-headed Cowbirds, Common Grackles, and American Crow damage management program in the State of Alabama. An IWDM approach would be implemented to reduce damage activities to property, agricultural and natural resources, livestock, and public health and safety. Damage management would be conducted on property in Alabama when the resource owner (property owner) or manager requests assistance. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification or harassment would be recommended and utilized to reduce damage. In other situations, birds would be removed as humanely as possible using shooting, trapping, and registered pesticides. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. Bird damage management activities would be conducted in the State, when requested and funded, on private or public property, including airport facilities and adjacent or nearby properties, after an *Agreement for Control* or other comparable document has been completed. All management activities would comply with appropriate federal, state, and local laws. Appendix B provides a more detailed description of the methods that could be used under the proposed action.

3.1.2 Alternative 2 - Non-lethal Bird Damage Management Only By WS

This alternative would require WS to use non-lethal methods only to resolve bird damage problems. Requests for information regarding lethal management approaches would be referred to the Alabama Department of Conservation and Natural Resources, USFWS, local animal control agencies, or private businesses or organizations. Individuals might choose to implement WS' non-lethal recommendations, implement lethal methods or other methods not recommended by WS, contract for WS' direct control services, use contractual services of private businesses, or take no action. Persons

receiving WS' non-lethal technical and direct control assistance could still resort to lethal methods that were available to them. Currently, DRC-1339 and alpha-chloralose are only available for use by WS' employees. Therefore, use of these chemicals by private individuals would be illegal. However, the restricted use pesticide, Starlicide, is similar to DRC-1339 and may be used by certified applicators. Avitrol could also be used by state certified restricted-use pesticide applicators. Appendix B describes a number of non-lethal methods available for use by WS under this alternative.

3.1.3 Alternative 3 - Technical Assistance Only

This alternative would not allow for WS' operational BDM in Alabama. WS would only provide technical assistance and make recommendations when requested. Producers, property owners, agency personnel, or others could conduct BDM using any lethal or non-lethal method available to them. Avitrol could only be used by State certified pesticide applicators. Currently, DRC-1339 and alpha-chloralose are only available for use by WS' employees. Therefore, use of these two chemicals by private individuals would be illegal. However, the restricted use pesticide, Starlicide, is similar to DRC-1339 and may be used by certified applicators. Appendix B describes a number of methods that could be employed by private individuals or other agencies after receiving technical assistance advice under this alternative.

3.1.4 Alternative 4 - No Federal WS' Bird Damage Management

This alternative would eliminate WS' involvement in BDM in Alabama. WS would not provide direct operational or technical assistance and requesters of services would have to conduct their own BDM without WS' input. Requests for information would be referred to the Alabama Department of Conservation and Natural Resources, USFWS, local animal control agencies, or private businesses or organizations. Individuals might choose to conduct BDM themselves, use contractual services of private businesses, or take no action. DRC-1339 and alpha-chloralose are only available for use by WS' employees. Therefore, use of these chemicals by private individuals would be illegal. However, the restricted use pesticide, Starlicide, is similar to DRC-1339 and may be used by certified applicators. Avitrol could also be used by State certified restricted-use pesticide applicators.

3.2 BDM STRATEGIES AND METHODOLOGIES AVAILABLE TO WS IN ALABAMA

The strategies and methodologies described below include those that could be used or recommended under Alternatives 1, 2 and 3 described above. Alternative 4 would terminate both technical assistance and operational BDM by WS. Appendix B contains a more thorough description of the methods that could be used or recommended by WS.

3.2.1 Integrated Wildlife Damage Management (IWDM)

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement the best combination of effective management methods in a cost-effective[6] manner while minimizing the potentially harmful effects on humans, target and non-target species, and the environment. IWDM may incorporate cultural practices (e.g., animal husbandry), habitat modification (e.g., exclusion), animal behavior modification (e.g., scaring), removal of individual offending animals, local population reduction, or any combination of these, depending on the circumstances of the specific damage problem.

[6] The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns.

3.2.2 The Integrated Wildlife Damage Management Strategies That WS' Employs

3.2.2.1 Technical Assistance Recommendations

Technical assistance as used herein is information, demonstrations, and advice on available and appropriate wildlife damage management methods. The implementation of damage management actions is the responsibility of the requester. In some cases, WS provides supplies or materials that are of limited availability for non-WS entities to use. Technical assistance may be provided through a personal or telephone consultation, or during an on-site visit with the requester. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on the level of risk, need, and the practicality of their application.

Under APHIS' NEPA implementing regulations and specific guidance for the WS' program, WS' technical assistance is categorically excluded from the need to prepare an EA or EIS. However, it is discussed in this EA because it is an important component of the IWDM approach to resolving bird damage problems.

3.2.2.2 Direct Damage Management Assistance (Direct Control)

Direct damage management assistance is damage management activities that are directly conducted or supervised by WS' personnel. Direct damage management assistance may be initiated when the problem cannot effectively be resolved through technical assistance alone, and when *Agreements for Control* or other comparable instruments are provided for direct damage management by WS. The initial investigation defines the nature, history, extent of the problem, species responsible for the damage, and methods that would be available to resolve the problem. Professional skills of WS' personnel are often required to effectively resolve problems, especially if restricted use pesticides are necessary, or if the problems are complex.

3.2.2.3 Educational Efforts

Education is an important element of WS' program activities because wildlife damage management is about finding balance and coexistence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather, is in continual flux. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, lectures and demonstrations are provided to producers, homeowners, state and county agents, and other interested groups. WS frequently cooperates with other agencies in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that WS' personnel, other wildlife professionals, and the public are periodically updated on recent developments in damage management technology, laws and regulations, and agency policies.

3.2.2.4 Research and Development

The National Wildlife Research Center (NWRC) functions as the research arm of WS by providing scientific information and development of methods for wildlife damage management that are effective and environmentally responsible. NWRC scientists work closely with wildlife managers, researchers, field specialists and others to develop and evaluate wildlife damage management techniques. NWRC research was instrumental in the development of methyl anthranilate. In addition, NWRC is currently testing new experimental drugs that inhibit bird reproduction. NWRC scientists have authored hundreds of scientific publications and reports, and are respected world-wide for their expertise in wildlife damage management.

3.2.2.5 Examples of WS' Direct Operational and Technical Assistance in BDM in Alabama.

Management of Hazards to Aircraft and Air Passengers in Alabama

WS participates with the Federal Aviation Administration, under a MOU, to provide BDM information or services to airports in Alabama. Upon request, WS evaluates wildlife hazards at airports and provides Wildlife Hazard Assessments outlining the wildlife hazards found. These assessments assists airports in developing Wildlife Hazard Management Plans to address specific wildlife hazards and threats using an IWDM approach to resolving wildlife conflicts. WS also assists airports in obtaining USFWS depredation permits by providing recommendations to the USFWS for purpose of managing hazards and threats posed by migratory birds.

Currently, WS provides technical advice and conducts Wildlife Hazard Assessments at Alabama airports. Wildlife Hazards Assessments are typically year-long studies which result in site-specific recommendations for reducing wildlife hazards at airports based on data collected. WS' personnel provide ongoing technical advice to airport managers about how to reduce the presence of wildlife in airport environments, which may include technical advice and information on habitat modifications. In an effort to reduce bird strike hazards at airport facilities, WS promotes improved bird strike record keeping and maintains a program of bird identification and monitoring of bird numbers at participating airports.

WS may receive requests for assistance in resolving wildlife hazards to aviation in the future from airports previously discussed, or any other airports in Alabama. WS may provide technical assistance and/or direct operational assistance using any combination of approved methods discussed in this EA which are appropriate for use in airport environments.

Rock Pigeon Problems

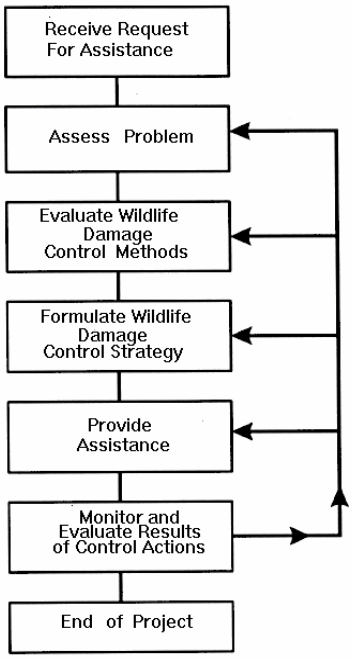
Pigeons are responsible for the majority of nuisance bird damage and human health and safety requests for assistance in Alabama. The most common situation with this species involves pigeons roosting and nesting on buildings and structures. The main problem is from the birds' droppings which cause concerns for diseases, create an unsightly mess, and result in high clean-up costs. These problems are frequently addressed by recommending exclusion devices/barriers (such as netting, hardware cloth, screen, porcupine wire) or habitat modification and local population reduction. Methods that could be used or recommended for population reduction include shooting with pellet rifles, low-velocity .22 caliber rifle rounds (that shoot bullets at about the same velocity as a pellet rifle), shotguns (mostly in rural or semi-rural situations), live capture with cage traps followed by euthanasia, DRC-1339 baiting, or Avitrol.

WS has been requested in the past to manage damage caused by pigeons through direct operational projects. These projects have included activities to reduce local pigeon numbers in or at several cities and facilities around the State. WS expects to receive future requests from entities presently or previously assisted, as well as other entities across the State. WS could respond with technical assistance, direct operational assistance, or a combination of both in any situation in the State.

3.2.3 WS' Decision Making

WS' personnel use a thought process for evaluating and responding to damage complaints that are depicted by the WS' Decision Model described by Slate et al., in 1992 (Figure 3-1). WS' personnel are frequently contacted after requesters have tried or considered non-lethal methods and found them to be impractical, too costly, or inadequate for acceptably reducing damage. WS' personnel assess the damage, evaluate the appropriateness, and availability (legal and administrative) of strategies and methods based on biological, economic and social considerations. Following this evaluation, methods deemed to be practical for the situation are incorporated into a management strategy. After this strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for further management is ended. In terms of the WS' Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and monitoring the results of the damage management strategy. The Decision Model is not a written documented process, but a mental problem-solving process common to most if not all professions.

Figure 3-1 – WS' Decision Model



3.2.4 Bird Damage Management Methods Available for Use

3.2.4.1 Non-chemical, Non-lethal Methods

Agricultural producer and property owner practices consist primarily of non-lethal preventive methods such as cultural methods[7] and habitat modification.

Animal behavior modification refers to tactics that alter the behavior of birds to reduce damages. Some but not all of these tactics include the following:

- Exclusions such as netting
- Propane exploders (to scare birds)
- Pyrotechnics (to scare birds)
- Distress calls and sound producing devices (to scare birds)
- Visual repellents and scaring tactics
- Relocation or dispersal of damaging birds to other areas
- Nest destruction of the target species before eggs or young are in the nest
- Egg addling/oiling/destruction (the practice of destroying the embryo in the egg prior to hatching; physically breaking eggs; or directly removing eggs from a nest and destroying them)
- Habitat/environmental modification to attract or repel certain bird species
- Live traps (traps to capture birds alive for relocation or euthanasia), e.g., clover traps, decoy traps, nest box traps, mist nets, corrals, etc.
- Lure crops/alternate foods (crops planted or other food resources provided to mitigate the potential loss of higher value crops)

[7] Generally, involves modifications to the management of protected resources to reduce their vulnerability to wildlife damage.

3.2.4.2 Chemical, Non-lethal Methods

Avitrol is a chemical frightening agent registered for use on pigeons, crows, gulls, blackbirds, European Starlings, and House Sparrows in various situations. This chemical works by causing distress behavior in birds that consume treated baits from a mixture of treated and untreated bait, which generally frightens the other birds from the site. Generally, birds that eat the treated bait will die (Johnson and Glahn 1994).

> **Alpha-chloralose** is used as an immobilizing agent, which is a central nervous system depressant, and used to capture waterfowl or other birds. It is generally used in recreational and residential areas, such as swimming pools, shoreline residential areas, golf courses, or resorts. Alpha-chloralose is typically delivered in well-contained bait in small quantities with minimal hazards to pets and humans; single baits consisting of bread or corn are fed directly to the target birds.

Methyl Anthranilate (MA) and **Di-methyl Anthranilate** (artificial grape flavoring food additive) has been shown to be an effective repellent for many bird species. It can be applied to turf or surface water or as a fog to repel birds from small areas. It may also become available for use as a livestock feed additive that has bird repellent value.

Other repellents: Other bird repellents that might become available include anthraquinone (Avery et al. 1997) and charcoal particles (e.g., adhered to livestock feed).

3.2.4.3 Mechanical, Lethal Methods

Shooting is more effective as a dispersal technique than as a way to reduce bird numbers. The number that can be killed by shooting is generally very small in relation to the number involved in damage situations. Usually, only a few dozen birds can be shot from individual flocks that can number anywhere from a few hundred to many thousands or hundreds of thousands before the rest of the birds become gun shy. Shooting, however, can be helpful in some situations to supplement and reinforce other dispersal techniques. It is selective for target species and may be used in conjunction with the use of spotlights, decoys, and calling. Shooting with rifles, shotguns, or pellet guns (rifles or pistols) is sometimes used to manage bird damage problems when lethal methods are determined to be appropriate. The birds are killed as quickly and humanely as possible.

Sport hunting can be part of a BDM strategy to enhance the effectiveness of harassment techniques.

Snap traps are modified rat traps that are used to remove individual birds causing damage to buildings.

Cervical dislocation is sometimes used to euthanize birds that are capture in live traps. AVMA has deemed this technique as a humane method of euthanasia and states that cervical dislocation when properly executed is a humane technique for euthanasia of poultry and of small birds (Beaver et al. 2001).

3.2.4.4 Chemical, Lethal Methods

DRC-1339 is a slow acting avicide for reducing damage from several species of birds, including blackbirds, starlings, pigeons, crows, ravens, magpies, and gulls. DRC-1339 is highly toxic to sensitive species but only slightly toxic to non-sensitive birds, predatory birds and mammals.

This chemical would be the primary lethal chemical method used for pigeon, starling, and blackbird damage management under the proposed program.

Starlicide (3-chloro-p-toluidine hydrochloride) is a restricted use pesticide that is formulated as a 0.1% ready-to-use product and is commercially available to certified applicators or persons under their supervision. This avicide may be recommended or used by WS to control European Starlings and Rock Pigeons. Starlicide may be used in feedlots, around buildings and fenced non-crop areas, bird staging and roosting areas, federal and state wildlife refuges, and other sites (EPA 1995). Starlicide is similar to DRC-1339 used in feedlots; however, it contains 0.1% DRC-1339 (USDA 1997, Appendix P). Therefore, the properties of this product are similar to DRC-1339.

Carbon dioxide (CO_2) gas is an AVMA approved euthanasia method which is sometimes used to euthanize birds which are captured in live traps or by chemical immobilization and when relocation is not a feasible option. Live birds are placed in a container or chamber into which CO_2 gas is released. The birds quickly expire after inhaling the gas.

3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

Several alternatives were considered, but not analyzed in detail. These were:

3.3.1 Lethal Bird Damage Management Only By WS

Under this alternative, WS would not conduct any non-lethal control of birds for BDM purposes in the State, but would only conduct lethal BDM. This alternative was eliminated from further analysis because some bird damage problems can be resolved effectively through non-lethal means and at times lethal methods may not be available for use due to safety concerns or local ordinances prohibiting the use of some lethal methods, such as the discharge of firearms. For example, a number of damage problems involving the encroachment of injurious birds into buildings can be resolved by installing barriers or repairing of structural damage to the buildings, thus excluding the birds. Further, such damage situations as immediately clearing a runway of a large flock of injurious birds could not be implemented immediately, while scaring them away through noise harassment might resolve the air passenger safety threat at once.

3.3.2 Compensation for Bird Damage Losses

The compensation alternative would require the establishment of a system to reimburse persons impacted by bird damage. This alternative was eliminated from further analysis because no federal or state laws currently exist to authorize such action. Under such an alternative, WS would not provide any direct control or technical assistance. Aside from lack of legal authority, analysis of this alternative in the FEIS indicated that the concept has many drawbacks (USDA 1997):

- It would require larger expenditures of money and labor to investigate and validate all damage claims, and to determine and administer appropriate compensation.

- Compensation would most likely be below full market value. It is difficult to make timely responses to all requests to assess and confirm damage, and certain types of damage could not be conclusively verified. For example, it would be impossible to prove conclusively in individual situations that birds were responsible for disease outbreaks even though they may actually have been responsible. Thus, a compensation program that requires verification would not meet its objective for mitigating such losses.

- Compensation would give little incentive to resource owners to limit damage through improved cultural, husbandry, or other practices and management strategies.

- Not all resource owners would rely completely on a compensation program and unregulated lethal control would most likely continue as permitted by State law.

- Compensation would not be practical for reducing threats to human health and safety.

3.3.3 Short Term Eradication and Long Term Population Suppression

An eradication alternative would direct all WS' program efforts toward total long term elimination of bird populations on private, state, local and federal lands wherever a cooperative program was initiated in the State.

In Alabama, eradication of native bird species (the European Starling, House Sparrow, and Rock Pigeon are not native to North America) is not a desired population management goal of State agencies. Although difficult to achieve, eradication of a local population of pigeons, sparrows or starlings may be the goal of individual BDM projects in fulfillment of Executive Order 13112 on invasive species (see Subsection 1.7.2). This is because pigeons, sparrows and starlings are not native to North America and are only present because of human introduction. However, eradication as a general strategy for managing bird damage will not be considered in detail because:

- All State and Federal agencies with interest in, or jurisdiction over, wildlife oppose eradication of any native wildlife species.

- Eradication is not acceptable to most people.

- Because Mourning Doves, blackbirds, crows and European Starlings are migratory, eradication would have to be targeted at the entire North American populations of these species to be successful. That would not be feasible or desirable.

Suppression would direct WS' program efforts toward managed reduction of certain problem populations or groups. In areas where damage can be attributed to localized populations of birds, WS can decide to implement local population suppression as a result of using the WS' Decision Model. Furthermore, it is not realistic or practical to consider large-scale population suppression as the basis of the WS' program. Typically, WS' activities in the State would be conducted on a very small portion of the sites or areas inhabited or frequented by problem species. Problems with the concept of suppression are similar to those described above for eradication.

3.4 STANDARD OPERATING PROCEDURES FOR BDM TECHNIQUES

3.4.1 Standard Operating Procedures (SOPs)

The current WS' program, nationwide and in Alabama, uses SOPs and these are discussed in detail in Chapter 5 of WS' FEIS (USDA 1997). Some key SOPs pertinent to the proposed action and alternatives include:

- The WS' Decision Model thought process which is used to identify effective wildlife damage management strategies and their effects.

- Reasonable and prudent measures or alternatives are identified through consultation with the USFWS and are implemented to avoid effects to T&E species.

- EPA-approved label directions are followed for all pesticide use. The registration process for chemical pesticides is intended to assure minimal adverse effects to the environment when chemicals are used in accordance with label directions.

- All WS' employees in the state who use restricted chemicals are trained and certified by, or else operate under the direct supervision of, program personnel or others who are experts in the safe and effective use of chemical BDM materials.

- All WS' employees in the state who use firearms are trained in the safe use and handling of firearms within 3 months of their employment and every two years afterward.

- The presence of non-target species is monitored before using DRC-1339 to control starlings, blackbirds, crows, and pigeons to reduce the risk of significant mortality of non-target species populations.

- Research is being conducted to improve BDM methods and strategies so as to increase selectivity for target species, to develop effective non-lethal control methods, and to evaluate non-target hazards and environmental effects.

Some additional SOPs specific to the current program include:

- Management actions would be directed toward localized populations or groups of target species and/or individuals of those species. Generalized population suppression across the State, or even across major portions of the State, would not be conducted.

- WS uses BDM devices and conducts activities for which the risk of hazards to public safety and hazard to the environment have been determined to be low according to a formal risk assessment (USDA 1997, Appendix P). Where such activities are conducted on private lands or other lands of restricted public access, the risk of hazards to the public is even further reduced.

3.4.2 Additional SOPs Specific to the Issues

The following is a summary of additional SOPs that are specific to the issues listed in Chapter 2 of this document.

3.4.2.1 Effects on Target Species Populations

- BDM activities are directed to resolving bird damage problems by taking action against individuals, or local populations or groups, not by attempting to eradicate populations in the entire area or region.

- WS take is monitored by comparing numbers of birds killed by species or species group (e.g., blackbirds) with overall populations or trends in populations to assure the magnitude of take is maintained below the level that would cause significant adverse effects to the viability of native species populations (See Chapter 4).

3.4.2.2 Effects on Non-target Species Populations, Including T&E Species

- WS' personnel are trained and experienced to select the most appropriate method

for taking problem animals and excluding non-targets.

- Observations of birds feeding at feedlots, dairies, or blackbird/starling staging areas or of birds that are associated with feral domestic pigeon concentrations are made to determine if non-target or T&E species would be at risk from BDM activities.

- WS has consulted with the USFWS regarding potential effects of control methods on T&E species, and abides by reasonable and prudent alternatives (RPAs) and/or reasonable and prudent measures (RPMs) established as a result of that consultation. For the full context of the Biological Opinion see the ADC' FEIS, Appendix F (USDA 1997).

- As appropriate, further consultation on species not covered by or included in that formal consultation process will be initiated with the USFWS and WS will abide by any RPAs, RPMs, and terms and conditions that result from that process to avoid jeopardizing any listed species.

- WS uses chemical methods for BDM that have undergone rigorous research to prove their safety and lack of serious effects on non-target animals and the environment.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.0 INTRODUCTION

Chapter 4 provides information needed for making informed decisions in selecting the appropriate alternative for meeting the purpose of the proposed action. The chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2. This section analyzes the environmental consequences of each alternative in comparison with the no action alternative to compare the real or potential effects.

The following resource values within the State are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. These resources will not be analyzed further.

Cumulative Effects: Discussed in relationship to each of the alternatives analyzed, with emphasis on potential cumulative effects from methods employed, and including summary analyses of potential cumulative impacts to target and non-target species, including T&E species.

Irreversible and Irretrievable Commitments of Resources: Other than minor uses of fuels for motor vehicles and other materials, there are no irreversible or irretrievable commitments of resources.

Effects on sites or resources protected under the National Historic Preservation Act: WS' BDM actions are not undertakings that could adversely affect historic resources (See Section 1.7.2).

4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

As described in section 2.1, in those situations where a non-federal cooperator has already made the decision to remove or otherwise manage pigeons, starlings, and to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, however, certain aspects of the human environment may actually benefit more from WS' involvement than from a decision not to assist. For example, if a cooperator believes WS has greater expertise to selectively remove a target species than a non-WS entity; WS' management activities may have less of an impact on target and non-target species than if the non-federal entity conducted the action alone. Thus, in those situations, WS' involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

4.1.1 Effects on Target Species Populations

4.1.1.1 Alternative 1. - Integrated Bird Damage Management Program (Proposed Action/No Action)

Analysis of this issue is limited to those species killed during WS' BDM. The analysis for magnitude of impact generally follows the process described in Chapter 4 of USDA (1997). Magnitude is described in USDA (1997) as "*…a measure of the number of animals killed in relation to their abundance*." Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations are based on population trends and harvest data when available. Generally, WS only conducts damage management on species whose population densities are high and usually only after they have caused damage.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage damage caused by birds with or without WS' assistance, WS' participation in carrying out the action will not affect the *environmental status quo*.

Breeding Bird Surveys. Bird populations can be monitored by using data from the Breeding Bird Surveys (BBS). The BBS is a large-scale inventory of North American birds coordinated by the U.S. Geological Survey, Patuxent Wildlife Research Center (Sauer et al. 2006). The BBS is a combined set of over 3,700 roadside survey routes primarily covering the continental United States and southern Canada. The BBS was started in 1966, and routes are surveyed in June by experienced birders. The stated primary objective of the BBS has been to generate an estimate of population change for all breeding birds. Populations of birds tend to fluctuate, especially locally, as a result of variable annual local habitat and climatic conditions. Trends can be determined using different population equations and statistically tested to determine if a trend is significant. The significance of a trend's change is reflected in the calculated P-value (probability) for that species.

The BBS data is best used to monitor population trends. However, the average number of birds per route (relative abundance) can be used to theoretically estimate the population size (relative abundance/10 mi^2 x 52,273 (total land/water area in Alabama in square miles). To use these population estimates the following assumptions would need to be accepted.

1. All birds within a quarter mile of the observer are seen at all stops on a BBS route; this assumption is faulty because observers often cannot see a quarter mile in radius at all stops due to obstructions such as hills, trees, and brush and because some bird species can be very elusive. Therefore, the number of birds seen per route would provide a conservative estimate of the population.
2. The chosen survey routes are totally random and are fully representative of available habitats. When BBS routes are established, survey rules allow the observers to make stops for surveys based on better quality habitat or convenient parking areas, even though the survey sites are supposed to be spaced a half-mile apart. Therefore, if survey areas had stops with excellent food availability, the count survey could be biased. This would tend to overestimate the population. However, if these sites were not on a route at all, the population could be underestimated.
3. Birds are equally distributed throughout the survey area and routes were randomly selected. Routes are randomly picked throughout the State, but are placed on the nearest available road. Therefore, the starting point is picked for accessibility by vehicle. However, a variety of habitat types are typically covered since most BBS routes are selected because they are "off the beaten path" to allow observers to hear birds without interruption from vehicular noise.

Christmas Bird Counts. The National Audubon Society (NAS) conducts nationwide bird surveys in December to early January. The Christmas Bird Counts (CBC) reflect the number of birds frequenting the state during the winter months. The CBC data does not provide a population estimate, but can be used as an indicator of trends in the population. Researchers have found that population trends reflected in CBC data tend to correlate well with those from censuses taken by more stringent means (NAS 2006).

European Starling and Blackbird Population Effects

Colonization of North America by the European Starling began on March 6, 1890 when 80 European Starlings were released into New York's Central Park by a member of the Acclimatization Society. The birds thrived and exploited their new habitat. By 1918, the

advance line of migrant juveniles extended from Ohio to Alabama; by 1926 from Illinois to Texas; by 1941 from Idaho to Kentucky; and by 1946 to California and Canadian coasts (Miller 1975). In just 50 short years the starling had colonized the United States and expanded into Canada and Mexico and 80 years after the initial introduction had become one of the most common birds in North America (Feare 1984).

Precise counts of blackbird and starling populations do not exist but one estimate placed the U.S. summer population of the blackbird group at more than one billion (USDA 1997) and the winter population at 500 million (Royall 1977). The nationwide starling population has been estimated at 140 million (Johnson and Glahn 1994). The majority of these birds occur in the eastern U.S.; for example surveys in the southeastern part of the country estimated 350 million blackbirds and European Starlings in winter roosts (Bookhout and White 1981). Meanley and Royall (1976) estimated 538 million blackbirds and European Starlings in winter roosts across the country during the winter of 1974-75. Of this total 74%, or 259 million of these birds were in the east. The winter starling population in the eastern U. S. was estimated by Meanley and Royall (1976) to be more than 87 million. The eastern U.S. population of the remaining blackbird group was estimated at 285.5 million. An extensive population survey by Dolbeer and Stehn published in 1979 showed that, in the southeastern U.S., the number of breeding European Starlings increased between 1966 and 1976. Breeding Bird Survey trend data (Sauer et al. 2006), Christmas Bird Count trend data (NAS 2006), and U.S. winter population estimates by species (Meanley and Royall 1976) are presented in Table 4-1.

Table 4-1. Breeding Bird Survey and Christmas Bird Count trend data from 1966-2005; and U.S. blackbird population estimates by species.

Species	BBS Alabama	BBS Eastern Region	United States	BBS Survey-wide	CBC Alabama	CBC United States	U.S. Winter Population Estimate
Red-winged Blackbird	-4.4%	-1.4%	-0.8%	-0.9%	stable	stable	190 million
Brown-headed Cowbird	-1.2%	-1.8%	-0.9%	-1.2%	stable	stable	90 million
Common Grackle	-3.9%	-1.2%	-1.2%	-1.1%	stable	decreasing	100 million
European Starling	-0.9%	-0.9%	-0.6%	-0.9%	stable	decreasing	98 million

A depredation order exists under the MBTA for blackbirds (50 CFR 21.43). Under the depredation order, no permit is required to take blackbirds (Red-winged Blackbirds, Brown-headed Cowbirds, Common Grackles, and American Crows) if they are found committing or about to commit damage upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance. European Starlings are not protected under the MBTA and require no permit from the USFWS for take to occur.

From FY 1999 through FY 2005, Alabama WS killed no blackbirds and one European Starling while conducting BDM activities throughout the State. Based upon an anticipated increase in requests for services, WS anticipates that no more than 10,000 European Starlings, 500 Brown-headed Cowbirds, 500 Common Grackles, and 1,000 Red-winged Blackbirds could be lethally removed by WS in Alabama on an annual basis.

Natural mortality in blackbird populations is between 50% and 65% of the population each year, regardless of human-caused control operations (USDA 1997). The annual winter population of the blackbird group in the eastern U.S. is at least 372 million (Johnson and Glahn 1994, Meanley and Royall 1976). Dolbeer et al. (1995) showed that WS kills of 3.6% of the wintering population had no effect on breeding populations the following spring. Dolbeer et al. (1976) constructed a population model which indicated that a reduction of 14.8% of the wintering blackbird population would reduce the spring breeding population by 20% and that a 56.2% reduction in the wintering blackbird population would reduce spring breeding populations by only 33%. Given the density-dependent relationships in a blackbird population (i.e., decreased mortality and increased fecundity of surviving birds); a much higher number would likely have to be killed in order to impact the regional breeding population. In an analysis of North American blackbird populations in 1975, USFWS concluded that removal of 67.5 million birds would not affect the following years post-breeding population (USDI 1976).

Because European Starlings are non-native and exhibit negative effects on, and competition with, native birds (Ehrlich et al. 1988), they are considered by many wildlife biologists and ornithologists to be an undesirable component of North American wild and native ecosystems. Any reduction in starling populations in North America, even to the extent of complete eradication, could be considered a beneficial impact to native bird species.

Based upon the density-dependent relationships in a blackbird population; WS' program activities in Alabama affecting less than 0.0012% of the nationwide summer blackbird group population and less than 0.0024% of the annual natural mortality/winter population; and affecting less than 0.0008% of the nationwide summer blackbird group population in the eastern U.S. and less than 0.0018% of the annual natural mortality/winter population, WS' management actions will have no adverse affect on state, regional or continental blackbird or European Starling populations.

Mourning Dove Population Effects

Mourning doves are migratory game birds with substantial populations throughout much of North America. This species is the most abundant dove in North America and is expanding northward (Ehrlich et al. 1988). Many States in the U.S. have regulated annual hunting seasons for the species. Alabama allows a hunting season each year with generous bag limits. The Mourning Dove sport harvest from 2001 - 2005 in Alabama ranged from 1.21 to 1.92 million birds, with an annual average sport harvest of 1.59 million birds/season (K. Guyse, Alabama Dept. of Conservation and Natural Resources, pers. comm. 2006).

Mourning doves are protected by the USFWS under the MBTA and take is limited by permit. Therefore, doves are taken in accordance with applicable state and federal laws and regulations authorizing take of migratory birds and their nest and eggs, including the USFWS and ADCNR permitting processes. The USFWS, as the agency with management responsibility, could impose restrictions on depredation harvest as needed to assure cumulative take does not adversely affect the continued viability of populations. This should assure that cumulative impacts on Mourning Dove populations would have no significant adverse impact on the quality of the human environment.

According to BBS trend data provided by Sauer et al. (2006) from 1966-2005 Mourning Dove populations have increased at an annual rate of 0.5% in the Eastern Region and have decreased at an annual rate of -1.4% and -0.2 % in Alabama and the United States, respectively. With a relative abundance of 33.65, a total Alabama Mourning Dove population could be estimated at approximately 176,000 birds during the breeding season. Alabama CBC data from 1966-2005

shows an increasing population trend for wintering populations of Mourning Doves throughout the state (NAS 2006).

Alabama WS killed 1,464 Mourning Doves from FY 1993 through FY 1998 while conducting BDM activities throughout the State, primarily to alleviate threats to human safety and for the protection of property at airports. No Mourning Doves were taken from FY 1999 through FY 2006. Based upon an anticipated increase in requests for services, WS anticipates that no more than 3,000 Mourning Doves would be lethally removed by WS in Alabama on an annual basis to protect property and reduce threats to human safety associated with large flocks of Mourning Doves at airports. Doves will only be lethally removed when deemed a hazard to air safety when congregated in such numbers at airports to pose a threat to property from aircraft strikes and threats to passenger safety.

WS' BDM activities represent less than 0.15% - 0.24% of the number of Mourning Doves killed by hunters and under USFWS issued depredation permits in Alabama each year, and affect less than 1.7% of the estimated Alabama summer Mourning Dove population. Take would occur primarily during the fall migration when populations are typically at the highest. Based upon the high reproductive capabilities of this bird species, the low proportions of potential take, and with take only occurring when doves are deemed a threat to human safety and property at airports, WS' management actions will have no adverse affect on state, regional or continental Morning Dove populations nor will WS' proposed take impact the ability to harvest doves during the recreational harvest season.

Black and Turkey Vulture Population Effects

Two species of vultures exist in Alabama: the Black Vulture and Turkey Vulture. Black vultures occur throughout the southeastern U.S., Texas, Mexico, and parts of Arizona (Buckley 1999). Vultures provide an ecologically beneficial function by scavenging carcasses of dead wildlife and consuming potentially diseased, dying wildlife. Black vultures have been expanding their range northward in the eastern United States (Wilbur 1983, Rabenhold and Decker 1989). Turkey vultures occur in all of Mexico, most of the U.S., and in the southern tier of Canada (Kirk and Mossman 1998). Both species are considered migratory but are largely resident birds in Alabama and other southern states. They are both protected by the USFWS under the MBTA. Vultures are taken in accordance with applicable state and federal laws and regulations authorizing take of migratory birds and their nest and eggs, including the USFWS and ADCNR permitting processes.

The USFWS, as the agency with management responsibility, could impose restrictions on depredation harvest as needed to assure cumulative take does not adversely affect the continued viability of populations. This should assure that cumulative impacts on Turkey Vulture and Black Vulture populations would have no significant adverse impact on the quality of the human environment. From 2001 to 2006, the USFWS annually issued an average of 2 depredation permits for Turkey Vultures and approximately 4 permits for Black Vultures to non-WS entities in Alabama (See Table 4-2). Under those permits for the take of Turkey Vultures, an average of 7.4 birds were reported killed annually (excluding 2006) by non-WS entities. Non-WS entities reporting taking an average of 13.4 Black Vultures annually (excluding 2006), under permits issued by the USFWS.

Table 4-2. Number of Turkey Vultures and Black Vultures Permits Issued by USFWS to Non-WS Entities in Alabama, Including Number of Birds Authorized For Take and Subsequently Taken, 2001 – 2006 (C. Simonton, USFWS, pers. comm. April 4, 2007)

Turkey Vulture	2001	2002	2003	2004	2005	2006
# Permits	2	1	3	2	1	3
# Authorized	25	5	27	10	5	65
# Reported	2	1	1	1	1	1
# Taken	10	5	5	5	12	N/A
Black Vulture	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
# Permits	3	3	3	4	3	5
# Authorized	60	40	113	125	110	205
# Reported	2	1	1	2	1	N/A
# Taken	15	9	10	15	18	N/A

According to BBS trend data provided by Sauer et al. (2006), from 1966-2005 Turkey Vulture populations have increased at an annual rate of 3.6% in the Eastern Region, and have increased at an annual rate of 2.9% and 1.5% in Alabama and the U.S., respectively. With a relative abundance of 3.18 birds per survey route, a total Alabama Turkey Vulture population could be estimated at approximately 16,700 birds. Alabama Christmas Bird Count data from 1966-2005 shows an increasing population trend for wintering Turkey Vultures throughout the state (NAS 2006).

Likewise, BBS trend data from 1966-2005 indicate Black Vulture populations have increased at an annual rate of 2.7% in the Eastern Region, and have increased at an annual rate of 0.4% and 3.2% in Alabama and the U.S., respectively. With a relative abundance of 2.01 per survey route, a total Alabama breeding Black Vulture population could be estimated at approximately 10,500 birds. Alabama CBC data from 1966-2005 shows a great deal of fluctuation in wintering populations of Black Vultures; however, from 1998-2005, Black Vulture numbers steadily increased (NAS 2006).

Alabama WS killed 300 Black Vultures and no Turkey Vultures from FY 1993 – FY 2006 while conducting BDM activities in the State. Based upon an anticipated increase in requests for services, WS estimates that no more than 500 Black Vultures and 100 Turkey Vultures would be lethally removed by WS in Alabama on an annual basis. The ecologically beneficial functions of vultures will be considered when determining the appropriate methods to employ to reduce or alleviate damage associated with vultures.

Anticipated WS' vulture BDM activities will result in the annual mortality of no more than 4.8% of the population of Black Vultures and no more than 0.6% of the population of Turkey Vultures' breeding in Alabama annually. Based upon the low proportions of potential take, WS' management actions will have no adverse affect on state, regional or continental Black Vulture and Turkey Vulture populations.

Rock Pigeon Population Effects

Rock Pigeons are a non-indigenous species that were first introduced into the U.S. by European settlers as a domestic bird to be used for sport, carrying messages, and as a source of food (USFWS 1981). Many of these birds escaped and eventually formed the feral pigeon populations that are now found throughout the U.S., southern Canada, and Mexico (Williams and Corrigan 1994). However, because pigeons are an introduced rather than a native species, they are not protected by federal law or by Alabama state law.

Pigeons are closely associated with humans where human structures and activities provide them with food and sites for roosting, loafing, and nesting (Williams and Corrigan 1994). Thus, they are commonly found around city buildings, bridges, parks, farm yards, grain elevators, feed mills, and other manmade structures (Williams and Corrigan 1994). Additionally, although pigeons are primarily grain and seed eaters, they will readily feed on garbage, livestock manure, spilled grains, insects, and any other available bits of food (Williams and Corrigan 1994).

According to BBS trend data provided by Sauer et al. (2006) from 1966-2005 pigeon populations have increased at an annual rate of 3.6% in Alabama and have decreased slightly at an annual rate of -0.1% and -0.4% in the Eastern Region and the U.S., respectively. With a relative abundance of 3.71, a total Alabama summer pigeon population could be estimated at approximately 20,000 birds. Alabama CBC data from 1966-2005 shows an increasing population trend for wintering populations of pigeons throughout the state (NAS 2006).

Pigeons are non-indigenous and often have negative impacts on the environment. Therefore, these birds are considered by many wildlife biologists and ornithologists to be an undesirable component of North American wild and native ecosystems. Any reduction in pigeon populations could be considered a beneficial impact to the environment. Any BDM involving lethal control actions by WS for this species would be restricted to isolated, individual sites, or communities. In those cases where pigeons are causing damage or are a nuisance, complete removal of the local population could be achieved. This would be considered to be a beneficial impact on the human environment since the affected property owner or administrator would request and approve of the action. Although regional population impacts would be minor, even if significant regional or nationwide reductions could be achieved, this would not be considered an adverse impact on the human environment because the species is not part of native ecosystems. However, some individuals who experience aesthetic enjoyment of pigeons may consider major population reduction in some localities a negative impact.

From FY 1999 through FY 2004, Alabama WS killed an average of 546 pigeons per year statewide, primarily to reduce sanitation problems and human health and safety threats associated with accumulations of droppings in areas used by humans. From FY 2005 through FY 2006, Alabama WS killed 2,078 total pigeons. The number of pigeons lethally removed during future WS' bird damage management activities in Alabama is expected to remain fairly stable and consistent with numbers taken in past years; however, it is possible that WS could kill as many as 3,000 pigeons each year in such programs.

Based upon the fact that feral domestic pigeons are considered a non-native species and WS' BDM activities affecting less than 15% of the estimated Alabama summer pigeon population, WS' management actions will have no adverse affect on state, regional or continental feral domestic pigeon population.

House Sparrow Population Effects

House Sparrows were introduced to North America from England in 1850 and have spread throughout the continent (Fitzwater 1994). House Sparrows are found in nearly every habitat except dense forest, alpine, and desert environments. They prefer human-altered habitats and are abundant on farms and in cities and suburbs (Robbins et al. 1983).

According to BBS trend data provided by Sauer et al. (2006) from 1966-2005 House Sparrow populations have decreased at an annual rate of -5.0%, -2.8% and -2.6% throughout Alabama, the Eastern Region and the U.S., respectively. With a relative abundance of 17.82, a total Alabama summer House Sparrow population could be estimated at approximately 93,000 birds. Alabama

CBC data from 1966-2005 shows a decreasing population trend for wintering populations of House Sparrows throughout the state (NAS 2006).

Robbins (1973) suggested that declines in the sparrow population must be largely attributed to changes in farming practices which resulted in cleaner operations. One aspect of changing farming practices which might have been a factor would be the considerable decline in small farms and associated disappearance of a multitude of small feed lots, stables and barns, a primary source of food for these birds in the early part of the 20th century. Ehrlich et al. (1988) suggested that House Sparrow population declines might be linked to the dramatic decrease during the 20th century in the presence of horses as transport animals. Grain rich horse droppings were apparently a major food source for this species.

House Sparrows are non-indigenous and often have negative impacts on native birds, primarily through competition for nesting sites. Therefore, sparrows are considered by many wildlife biologists and ornithologists to be an undesirable component of North American wild and native ecosystems. Any reduction in House Sparrow populations in North America, even to the extent of complete eradication, could be considered a beneficial impact to native bird species. Neither federal nor state laws protect this species. Any BDM involving lethal control actions by WS for this species would be restricted to isolated, individual sites, or communities. In those cases where sparrows are causing damage or are a nuisance, complete removal of the local population could be achieved. This would be considered to be a beneficial impact on the human environment since the affected property owner or administrator would request it. Although regional population impacts would be minor, even if significant regional or nationwide reductions could be achieved, this would not be considered an adverse impact on the human environment because the species is not part of native ecosystems. However, some individuals who experience aesthetic enjoyment of sparrows may consider major population reduction in some localities a negative impact.

Alabama WS killed no House Sparrows from FY 1999 through FY 2006. Based upon an anticipated increase in requests for services, Wildlife Services anticipates that no more than 1,000 House Sparrows could be lethally removed by WS in Alabama on an annual basis.

Based upon the fact that House Sparrows are considered a non-native species and WS' BDM activities affecting less than 1.1% of the estimated Alabama summer House Sparrow population, WS' management actions will have no adverse affect on state, regional or continental House Sparrow population.

American Crow Population Effects

American Crows have a wide range and are extremely abundant, being found across the U.S. (NAS 2000). They are found in both urban and rural environments and in Alabama sometimes form large communal roosts in cities. In the U.S., some crow roosts may reach a half-million birds (NAS 2000).

Historically, crow populations have benefited from agricultural development because of grains available as a food supply. Crows typically roost in trees with the combination of food and tree availability being favored. In some areas where abundant food and roosting sites are available, large flocks of crows tend to concentrate. In relation to this type of favorable habitat, crows may affect local agriculture trade. Crows may damage seedling corn plants by pulling the sprouts and consuming the kernels. At times, crows damage ripening corn during the milk and dough stages of development.

In the fall and winter, crows often form large roosting flocks in urban areas. These large flocks disperse to different feeding areas during the day. Crows will fly up to 6-12 miles from the roost to a feeding site each day (Johnson 1994). Large fall and winter crow roosts may cause serious problems in some areas particularly when located in towns or other sites near people. Such roosts are objectionable because of the odor of the bird droppings, health concerns, noise and damage to trees in the roost.

In some situations, large crow flocks may be a factor in spreading disease. At times, crows feed in and around farm buildings, where they have been implicated in the spread of transmissible gastroenteritis (TGE) among swine facilities. At other times, large flocks near wetland areas may increase potential for spread of waterfowl diseases such as avian cholera. The scavenging habits of crows and the apparent longer incubation time of the disease in these birds are factors that increase the potential for crows to spread this devastating disease. Also, crow roosts that have been in place for several years may harbor the fungus that causes histoplasmosis, a disease that can infect people who breath in spores when a roost is disturbed (Johnson 1994). In the past three years, the spread of WN virus by crows has become an epidemic for residents in Alabama. With the threat of WN virus spreading through the region, WS expects an increase in the number of technical assistance requests and the possible increase in the need to manage local crow populations.

BBS trend data from 1966-2005 indicate that American Crow populations have increased at an annual rate of 0.3%, 1.0%, and 0.9% throughout Alabama, the U.S., and the Eastern Region, respectively (Sauer et al. 2006). With a relative abundance of 43.32, a total Alabama summer crow population could be estimated at approximately 227,000 birds. Alabama CBC data from 1966-2005 shows a relatively stable population trend for wintering populations of crows throughout the state (NAS 2006).

American Crows are protected under the MBTA however, when crows are committing or about to commit damage upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance, a federal permit is not required for take to occur (50 CFR 21.43).

A recreational harvest season for crows exists in Alabama that is open year-around with no closed season and no limit on take. Hunters are not required to report their crow harvest in Alabama. Currently, harvest information is not available for crows.

No crows were killed by Alabama WS from FY 1999 through FY 2006. Based upon an anticipated increase in requests for services, WS anticipates that no more than 1,000 crows could be lethally removed by WS in Alabama on an annual basis.

Based upon an unrestricted hunting season and WS' BDM activities affecting less than 0.44% of the estimated Alabama summer crow population, WS' management actions will have no adverse affect on state, regional or continental crow population.

4.1.1.2 Alternative 2 - Non-lethal Bird Damage Management Only By WS

Under this alternative, only non-lethal methods would be used. Although WS' lethal take of sparrows, pigeons, blackbirds, crows, doves, vultures and starlings would not occur, it is likely that, without WS conducting some level of lethal BDM activities for these species; private BDM efforts would increase, leading to potentially similar or even greater effects on target species populations than those of the current program alternative. For the same reasons shown in the population effects analysis in section 4.1.1.1, however, it is unlikely that target bird populations

would be adversely impacted by implementation of this alternative. Frustration caused by the inability to reduce damage and associated losses and the lack of assistance could lead to illegal use of other chemicals which could lead to real but unknown effects on target bird populations (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). DRC-1339 and alpha-chloralose are currently only available for use by WS' employees and would not be available for use under this alternative. Effects and risks of illegal chemical toxicant use under this alternative would probably be about the same as those under Alternative 3, but less than Alternative 4.

4.1.1.3 Alternative 3 - Technical Assistance Only

Under this alternative, WS would have no impact on sparrows, pigeons, blackbirds, crows, doves, vultures and starling populations in the State because the program would not conduct any operational BDM activities but would be limited to providing technical assistance only. Private efforts to reduce or prevent bird damage and perceived disease transmission risks could increase which could result in similar or even greater effects on those populations than the current program alternative. For the same reasons shown in the population effects analysis in section 4.1.1.1, however, it is unlikely that target bird populations would be adversely impacted by implementation of this alternative. Frustration caused by the inability to reduce damage and associated losses could lead to illegal use of other chemicals which could lead to real but unknown effects on target bird populations (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). DRC-1339 and the tranquilizer alpha-chloralose are currently only available for use by WS' employees and would not be available for use under this alternative. Effects and risks of illegal chemical toxicant use under this alternative would be similar to those under Alternative 2.

4.1.1.4 Alternative 4 - No Federal WS' Bird Damage Management

Under this alternative, WS would have no impact on sparrows, pigeons, blackbirds, crows, doves, vultures and starlings populations in the State. WS would conduct no bird damage management activities under this alternative. Management actions taken by non-federal entities to manage those species would be considered the *environmental status quo*.

Private efforts to reduce or prevent depredations could increase which could result in effects on target species populations to an unknown degree. Effects on target species under this alternative could be the same, less, or more than those of the proposed action depending on the level of effort expended by private persons. For the same reasons shown in the population effects analysis in section 4.1.1.1 it is unlikely that target bird populations would be adversely impacted by implementation of this alternative. Similar to Alternative 2 and Alternative 3, frustration caused by the inability to reduce damage and associated losses and the lack of assistance could lead to illegal use of other chemicals which could lead to real but unknown effects on target bird populations (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). DRC-1339 and the tranquilizer alpha-chloralose are currently only available for use by WS' employees and would not be available for use under this alternative.

4.1.2 Effects on Other Wildlife Species, Including T&E Species

4.1.2.1 Alternative 1 - Integrated Bird Damage Management Program (Proposed Action / No Action)

Adverse Effects on Non-target (non-T&E) Species. Direct impacts on non-target species occur when WS' personnel inadvertently kill, injure, or harass animals that are not target species. In general, these impacts result from the use of methods that are not completely selective for target

species. Non-target migratory bird species and other non-target wildlife species are usually not affected by WS' management methods, except for the occasional scaring from harassment devices. In these cases, migratory birds and other affected non-target wildlife may temporarily leave the immediate vicinity, but would most likely return after conclusion of the action. Alabama WS has taken no known non-target species during BDM activities from FY 1999 through FY 2006.

WS' personnel are experienced and trained in wildlife identification, and to select the most appropriate methods for taking targeted animals and excluding non-target species. Shooting is virtually 100% selective for the target species; therefore no adverse impacts are anticipated from use of this method. Any non-target species captured in a live trap would be released unharmed on site. No adverse impacts from the use of registered pesticides and repellents are anticipated. Based on a thorough Risk Assessment, when WS' program chemical methods are used in accordance with label directions, they are highly selective to target individuals or populations, and such use has negligible effects on the environment (USDA 1997).

Although it is possible that some non-target birds may be unknowingly killed by use of DRC-1339 for pigeon, crow or blackbird/starling control, the method of application is designed to minimize or eliminate that risk. For example, DRC-1339 treated bait is only applied after a period of pre-baiting with untreated bait material and when non-target birds are not observed coming to feed at the site.

While every precaution is taken to safeguard against taking non-target birds, at times changes in local flight patterns and other unanticipated events can result in the incidental take of unintended species. These occurrences are rare and should not affect the overall populations of any species under the current program. WS' take of non-target species during BDM activities is expected to be extremely low to non-existent.

Beneficial Effects on Non-target Species. This alternative has the greatest possibility of reducing interspecific nest competition of starlings and Brown-headed Cowbirds on native wildlife species.

T&E Species Effects. Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures.

Federally Listed Species. WS has obtained and reviewed the list of federally listed T&E species for the state of Alabama (see Appendix C). WS has consulted with the USFWS under Section 7 of the ESA concerning potential impacts of BDM methods on T&E species and has obtained a BO. For the full context of the BO, see Appendix F of the ADC FEIS (USDA 1997, Appendix F).

WS' BDM activities in Alabama would not adversely affect the Alabama beach mouse (*Peromyscus polionotus ammobates*), Perdido Key beach mouse (*Peromyscus polionotus trissyllepsis*), Gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), Wood Stork (*Mycteria americana*), Piping Plover (*Charadrius melodus*), Alabama red-bellied turtle (*Pseudemys alabamensis*), Kemp's Ridley sea turtle (*Lepidochelys kempii*), Loggerhead sea turtle (*Caretta caretta*), Flattened musk turtle (*Sternotherus depressus*), Green sea turtle (*Chelonia mydas*), Gopher tortoise (*Gopherus polyphemus*), Eastern indigo snake (*Drymarchon corais couperi*), Alabama cavefish (*Speoplatyrhinus poulsoni*), Spotfin chub (*Erimonax monachus*), Snail darter (*Percina tanasi*), Slackwater darter (*Etheostoma boschungi*), Shiny pigtoe (*Fusconaia cor*), Pink mucket (pearlymussel) (*Lampsilis abrupta*),

White warty-back (pearlymussel) (*Plethobasus cicatricosus*), Rough pigtoe (*Pleurobema plenum*), Alabama lampmussel (*Lampsilis virescens*), Pale lilliput (pearlymussel) (*Toxolasma cylindrellus*), Cumberland monkeyface (pearlymussel) (*Quadrula intermedia*), Orangefoot pimpleback (*Plethobasus cooperianus*), Alabama canebrake pitcher-plant (*Sarracenia rubra alabamensis*), and Green pitcher plant (*Sarracenia oreophila*). This determination is based on the conclusions made by the USFWS during their 1992 programmatic consultation of WS' activities and subsequent BO (USDA 1997, Appendix F within the cited document). In addition, WS has determined that the use of BDM methods will have no effect on those Alabama T&E species not included in the 1992 BO or their critical habitats. Furthermore, WS has determined that the use alpha-chloralose and lasers will have no effect on any listed T&E species in the state.

Additionally, the 1992 BO from the USFWS determined that the only method that might adversely affect the Bald Eagle was above ground use of strychnine treated bait for nuisance birds. Strychnine is no longer registered for above ground use and would not be used by WS for BDM in the State. DRC-1339 poses no primary hazard to eagles because eagles do not eat grain or other bait materials on which this chemical might be applied during BDM, and, further, because eagles are highly tolerant to DRC-1339. Up to 100 mg doses of DRC-1339 were force fed to captive Golden Eagles with no mortality or adverse effects noted other than regurgitation and head-shaking (Larsen and Dietrich 1970). Secondary hazards to raptors from DRC-1339 and Avitrol are low to non-existent (see Appendix B). Therefore, WS' BDM in Alabama is not likely to have adverse affects on Bald Eagles.

The 1992 BO listed the gopher tortoise (*Gopherus polyphemus*) and the Eastern indigo snake (*Drymarchon corais couperi*) as species which might be adversely affected by some aspect of the WS' program. The USFWS states the concern of the potential affects of toxic baits and fumigants used for rodent and predator control. WS will not be using any rodent or predator toxicants or fumigants for BDM activities. Therefore, WS' BDM activities in Alabama are not likely to have an adverse affects of those species.

The Red-cockaded Woodpecker (*Picoides borealis*) was granted endangered status in 1970 (USFWS 2000). The 1992 BO from the USFWS made no determination concerning any effect by WS' BDM programs on the Red-cockaded Woodpecker and no effects from any component of a WS' BDM program were identified in the programmatic FEIS (USDA 1997). DRC-1339 nor Avitrol pose any primary hazard to Red-cockaded Woodpeckers because they do not eat grain or other bait materials on which this chemical might be applied during BDM programs. In addition, no secondary effects on Red-cockaded Woodpeckers are expected related to any actions in the Alabama WS' BDM program. WS has determined that BDM activities in Alabama will have no effect on the Red-cockaded Woodpecker.

Alabama State Listed T&E Species. WS has obtained and reviewed a list of those species listed as state threatened and endangered in Alabama and has determined that BDM activities will not adversely affect any state listed T&E species in Alabama. The Alabama Department of Conservation and Natural Resources, Wildlife and Freshwater Fisheries has concurred with this not likely to adversely affect determination (Keith Guyse, ADCNR Wildlife and Freshwater Fisheries Division, pers. comm. 2007).

Mitigation measures and SOPs to avoid adverse impacts to threatened and endangered species are described in Chapter 3 (Subsection 3.4.2) and are also described in Subsection 4.1.2 of this chapter. The inherent safety features of DRC-1339 and Avitrol use that preclude or minimize hazards to mammals and plants are described in Appendix B and in a formal risk assessment in the ADC FEIS (USDA 1997, Appendix P). Those measures and characteristics should

assure there would be no jeopardy to T&E species or adverse effects on mammalian or non-T&E bird scavengers from the proposed action.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage pigeons, starlings, and sparrows to stop damage with or without WS' assistance, WS' participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS' management activities may have less of an impact non-target species than if the non-federal entity conducted the action alone. Thus, in those situations, WS' involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

4.1.2.2 Alternative 2 - Non-lethal Bird Damage Management Only By WS

Under this alternative, WS would address requests for assistance to manage bird damage and threats to human safety using non-lethal methods only. Non-targets would likely be affected through use of non-lethal methods primarily through the use of exclusionary methods and from harassment techniques. Any impacts would like be temporary as non-targets would likely return once non-lethal techniques ceased, except when excluded. If bird damage problems were not effectively resolved by non-lethal control methods, members of the public may resort to other means of lethal control such as the use of shooting or even illegal use of chemical toxicants (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). This could result in less experienced persons implementing control methods and could lead to greater take of non-target wildlife than the proposed action. For example, shooting by persons not proficient at bird identification could lead to killing of non-target birds. It is possible that frustration caused by the inability to reduce damage and associated losses and the lack of assistance to manage damage caused by birds could lead to illegal use of chemical toxicants which could lead to impacts on local non-target species populations, including T&E species (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). Hazards to raptors, including Bald Eagles and falcons, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

4.1.2.3 Alternative 3 - Technical Assistance Only

Alternative 3 would not allow any WS' direct operational BDM in Alabama. Non-target or T&E species would not be impacted by WS' activities from this alternative. Technical assistance or self-help information would be provided at the request of interested persons. Although technical support might lead to more selective use of control methods by private parties than that which might occur under Alternative 4, private efforts to reduce or prevent damage could still result in less experienced persons implementing control methods, leading to greater take of non-target wildlife than under the proposed action. Similar to Alternative 2 and 4, frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could lead to unknown effects on local non-target species populations, including some T&E species (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). Hazards to raptors, including Bald Eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

4.1.2.4 Alternative 4 - No Federal WS' Bird Damage Management

Alternative 4 would not allow any WS' BDM in the State. There would be no impact on non-target or T&E species by WS' BDM activities from this alternative. Management actions taken

by non-federal entities to manage bird damage would be considered the *environmental status quo*.

Private efforts to reduce or prevent damage could increase which could result in less experienced persons implementing control methods and could lead to greater take of non-target wildlife than under the proposed action. It is possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could impact local non-target species populations, including some T&E species (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). Hazards to raptors, including Bald Eagles, could therefore, be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

4.1.3 Effects on Human Health and Safety

4.1.3.1 Effects of Chemical BDM Methods on Human Health and Safety

Alternative 1 - Integrated Bird Damage Management Program (Proposed Action/No Action)

DRC-1339. DRC-1339 is the primary lethal chemical BDM method that would be used under the proposed alternative. There has been some concern expressed by a few members of the public that unknown, but significant risks, to human health may exist from DRC-1339 used for BDM.

This chemical is one of the most extensively researched and evaluated pesticides ever developed. Over 30 years of studies have demonstrated the safety and efficacy of this compound. Appendix B provides more detailed information on this chemical and its use in BDM. Factors that virtually eliminate any risk of public health problems from use of this chemical are:

- its use is prohibited within 50 feet of standing water and cannot be applied directly to food or feed crops (contrary to some misconceptions expressed by a few members of the public, DRC-1339 is not applied to feed materials that livestock can feed upon).

- DRC-1339 is highly unstable and degrades rapidly when exposed to sunlight, heat, or ultraviolet radiation. The half-life is about 25 hours, which means that treated bait material generally is nearly 100% broken down within a week.

- It is more than 90% metabolized in target birds within the first few hours after they consume the bait. Therefore, little material is left in bird carcasses that may be found or retrieved by people.

- Application rates are extremely low (less than 0.1 lb. of active ingredient per acre) (EPA 1995).

- A human would need to ingest the internal organs of birds found dead from DRC-1339 to have any chance of receiving even a minute amount of the chemical or its metabolites into their system. This is highly unlikely to occur.

- The EPA has concluded that DRC-139 is not a mutagen or a carcinogen (i.e., cancer-causing agent) (EPA 1995). Notwithstanding, the extremely controlled and limited circumstances in which DRC-1339 is used would prevent any

exposure of the public to this chemical.

The above analysis indicates that human health risks from DRC-1339 use would be virtually non-existent under any alternative.

Avitrol (4-Aminopyridine). Avitrol is another chemical method that might be used by WS in BDM. Appendix B provides more detailed information on this chemical.

Avitrol is available as a prepared grain bait mixture or as a powder. It is formulated in such a way that ratios of treated baits to untreated baits are no greater than 1:9. Factors that virtually eliminate health risks to members of the public from use of this product as an avicide are:

- It is readily broken down or metabolized into removable compounds that are excreted in urine in the target species (ETOXNET 1996). Therefore, little of the chemical remains in birds to present a hazard to humans.

- A human would need to ingest the internal organs of birds found dead from Avitrol ingestion to have any chance of receiving even a minute amount of the chemical or its metabolites into his/her system. This is highly unlikely to occur. Furthermore, secondary hazard studies with mammals and birds have shown that there is virtually no hazard of secondary poisoning.

- Although Avitrol has not been specifically tested as a cancer-causing agent, the chemical was found not to be mutagenic in bacterial organisms (EPA 1997). Therefore, the best scientific information available indicates it is not a carcinogen. Notwithstanding, the extremely controlled and limited circumstances in which Avitrol is used would prevent exposure of members of the public to this chemical.

The above analysis indicates that human health risks from Avitrol use would be virtually non-existent under any alternative.

Other BDM Chemicals. Other non-lethal BDM chemicals that might be used or recommended by WS would include repellents such as methyl or di-methyl anthranilate (artificial grape flavoring used in foods and soft drinks sold for human consumption), which has been used as an area repellent, anthraquinone which is presently marketed as Flight Control®, and the tranquilizer drug alpha-chloralose. Such chemicals must undergo rigorous testing and research to prove safe, effective, and of low environmental risk before they would be registered by EPA or FDA. Any operational use of chemical repellents would be in accordance with labeling requirements under FIFRA and State pesticide laws and regulations which are established to avoid unreasonable adverse effects on the environment. Following labeling requirements and use restrictions are a built-in mitigation measure that would assure that use of registered chemical products would avoid significant adverse effects on human health.

Based on a thorough Risk Assessment, APHIS concluded that, when WS' uses chemical methods in accordance with label directions, the use of those chemical are highly selective to target individuals or populations and such use has negligible effects on the environment (USDA 1997).

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage birds to alleviate damage with or without WS' assistance, WS' participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS' involvement may actually

have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Alternative 2 - Non-lethal Bird Damage Management Only By WS

Alternative 2 would not allow for any lethal methods to be used by WS in the State. WS could only implement non-lethal methods such as harassment and exclusion devices and materials. Non-lethal methods could, however, include Avitrol, the tranquilizer drug alpha-chloralose and chemical repellents such as anthraquinone and methyl anthranilate which, although already considered safe for human consumption because it is an artificial grape flavoring, which might nonetheless raise concerns about human health risks. Such chemicals must undergo rigorous testing and research to prove safe, effective, and of low environmental risk before they would be registered by EPA or FDA. Any operational use of chemical repellents and tranquilizer drugs would be in accordance with labeling requirements under FIFRA and State pesticide laws and regulations and FDA rules which are established to avoid unreasonable adverse effects on the environment. Following labeling requirements and use restrictions are a built-in mitigation measure that would assure that use of registered chemical products would avoid significant adverse effects on human health.

Excessive cost or ineffectiveness of non-lethal techniques could result in some entities rejecting WS' assistance and resorting to other means of BDM. Such means could include illegal pesticide uses. Hazards to humans and pets could be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used. Frustration caused by the inability to alleviate bird damage could lead to illegal use of certain toxicants that could pose secondary poisoning hazards to pets (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). Some chemicals that could be used illegally would present greater risks of adverse effects on humans than those used under the proposed alternative.

Alternative 3 - Technical Assistance Only

Alternative 3 would not allow any direct operational BDM assistance by WS in the State. WS would only provide advice and, in some cases, equipment or materials (i.e., by loan or sale) to other persons who would then conduct their own damage management actions. Concerns about human health risks from WS' use of chemical BDM methods would be alleviated because no such use would occur. DRC-1339 and alpha-chloralose are only registered for use by WS' personnel and would not be available for use by private individuals. Private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing damage management methods and leading to a greater risk than the proposed action alternative. However, because some of these private parties would be receiving advice and instruction from WS, concerns about human health risks from chemical BDM methods use should be less than under Alternative 4. Commercial pest control services would be able to use Avitrol and Starlicide and such use would likely occur to a greater extent in the absence of WS' assistance. Use of Avitrol and Starlicide in accordance with label requirements should preclude any hazard to members of the public. Hazards to humans and pets could be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used. As with Alternative 2, frustration caused by the inability to alleviate bird damage could lead to illegal use of certain toxicants that, unlike WS' controlled use of DRC-1339 and Avitrol, could pose secondary poisoning hazards to pets (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). Some chemicals that could be used illegally would present greater risks of adverse effects on humans than those used under the proposed action alternative.

Alternative 4 - No Federal WS' Bird Damage Management

Alternative 4 would not allow any WS' BDM in the State. WS would have no impact on this issue. Management actions taken by non-federal entities to manage damage would be considered the *environmental status quo*.

Concerns about human health risks from WS' use of chemical BDM methods would be alleviated because no such use would occur. DRC-1339 and alpha-chloralose are only registered for use by WS' personnel and would not be available for use by private individuals. Private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing damage management methods and potentially leading to greater risk to human health and safety than the proposed action alternative. Commercial pest control services would be able to use Avitrol and Starlicide and such use would likely occur to a greater extent in the absence of WS' assistance. Use of Avitrol and Starlicide in accordance with label requirements should preclude any hazard to members of the public. However, hazards to humans and pets could be greater under this alternative if other chemicals that are less selective or that cause secondary poisoning are used. As with other alternatives, frustration caused by the inability to alleviate bird damage could lead to illegal use of certain toxicants that could pose secondary poisoning hazards to pets (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). Some chemicals that could be used illegally would present greater risks of adverse effects on humans than those used under the current program alternative.

4.1.3.2 Effects of Non-chemical BDM Methods on Human Health and Safety

Alternative 1 - Integrated Bird Damage Management Program (Proposed Action / No Action)

Non-chemical BDM methods that might raise safety concerns include shooting with firearms, traps, and harassment with pyrotechnics. Firearms are only used by WS' personnel who are experienced in handling and using them. WS' personnel receive safety training on a periodic basis to keep them aware of safety concerns. The Alabama WS' program has had no accidents involving the use of firearms, traps or pyrotechnics in which a member of the public was harmed. A formal risk assessment of WS' operational management methods found that risks to human safety were low (USDA 1997, Appendix P). Therefore, no adverse affects on human safety from WS' use of these methods is expected.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage pigeons, starlings, and sparrows to stop damage with or without WS' assistance, WS' participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS' involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Alternative 2 - Non-lethal Bird Damage Management Only By WS

Under this alternative, non-chemical BDM methods that might raise safety concerns include shooting with firearms when used as a harassment technique, traps and harassment with pyrotechnics. Firearms are only used by WS' personnel who are experienced in handling and using them. WS' personnel receive safety training on a periodic basis to keep them aware of safety concerns. The Alabama WS' program has had no accidents involving the use of firearms, traps or pyrotechnics in which a member of the public was harmed. A formal risk assessment of WS' operational management methods found that risks to human safety were low (USDA 1997,

Appendix P). Therefore, no adverse effects on human safety from WS' use of these methods are expected.

Alternative 3 - Technical Assistance Only

Under this alternative, WS would not engage in direct operational use of any non-chemical BDM methods. Risks to human safety from WS' use of firearms, traps and pyrotechnics would hypothetically be lower than the current program alternative, since WS would not be conducting direct control activities. Hazards to humans could be greater under this alternative if personnel conducting BDM activities using non-chemical methods are poorly or improperly trained.

Alternative 4 - No Federal WS' Bird Damage Management

Alternative 4 would not allow any WS' BDM in the State. WS would have no impact on this issue. Management actions taken by non-federal entities to birds would be considered the *environmental status quo*.

Concerns about human health risks from WS' use of non-chemical BDM methods would be alleviated because no such use would occur. The use of firearms, traps or pyrotechnics by WS would not occur in BDM activities in the State. However, private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing damage management methods and potentially leading to greater risk to human health and safety than the proposed action alternative. Commercial pest control services would be able to use pyrotechnics, traps or firearms in BDM programs and this activity would likely occur to a greater extent in the absence of WS' assistance. Hazards to humans could be greater under this alternative if personnel conducting BDM activities using non-chemical methods are poorly or improperly trained.

4.1.3.3 Effects on Human Health and Safety Caused by Birds

Alternative 1 - Integrated Bird Damage Management Program (Proposed Action/No Action)

People are concerned with potential injury, illness, and loss of human life as a result of the potential impacts of injurious bird species. An Integrated BDM strategy, a combination of lethal and non-lethal means, has the greatest potential of successfully reducing this risk. All BDM methods could possibly be implemented and recommended by WS.

An IWDM approach reduces damage or threats to public health or safety for people who would have no relief from such damage or threats if non-lethal methods were ineffective or impractical. As discussed in Chapter 1, birds are a threat to aviation safety and can carry or be involved in the cycle of diseases that are transmittable to humans and that can adversely affect human health. In most cases, it is difficult to conclusively prove that birds were responsible for transmission of individual human cases or outbreaks of bird-borne diseases. Nonetheless, certain requesters of BDM service may consider this risk to be unacceptable and may request such service primarily for that reason. In such cases, BDM, either by lethal or non-lethal means, would, if successful, reduce the risk of bird-borne disease transmission at the site for which BDM is requested.

In some situations the implementation of non-lethal controls such as electric or porcupine wires, netting barriers, and harassment could actually increase the risk of human health problems at other sites by causing the birds to move to other urban roosting sites not previously affected. In such cases, lethal removal of the birds may actually be the best alternative from the standpoint of

overall human health concerns in the local area. If WS is providing direct operational assistance in relocating birds, coordination with local authorities may be conducted to assure they do not reestablish in other undesirable locations.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage pigeons, starlings, and sparrows to stop damage with or without WS' assistance, WS' participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS' involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Alternative 2 - Non-lethal Bird Damage Management Only By WS

Under this alternative, WS would be restricted to implementing and recommending only non-lethal methods in providing assistance with bird damage problems. The success or failure of the use of non-lethal methods can be highly variable. In some situations the implementation of non-lethal controls such as electric or porcupine wires, netting barriers, and harassment could actually increase the risk of human health problems at other sites by causing the birds to move to other urban roosting sites not previously affected. Some requesting entities such as city government officials would reject WS' assistance for this reason and would likely seek to achieve bird control by other means. However, if WS is providing direct operational assistance in relocating birds, coordination with local authorities may be conducted to assure they do not reestablish in other undesirable locations. Because DRC-1339 would not be available for use by non-WS' personnel, it may be difficult to achieve local population reduction. In such cases, human health risks may remain the same or increase.

Alternative 3 - Technical Assistance Only

With WS' technical assistance but no direct operational assistance, entities requesting BDM for human health concerns would either take no action, which means the risk of human health problems would likely continue or increase in each situation as bird numbers are maintained or increased, or implement WS' recommendations for non-lethal and lethal control methods. Potential impacts would be variable. Individuals or entities that implement management actions may or may not have the experience necessary to efficiently and effectively conduct an effective BDM program. In some situations the implementation of non-lethal controls such as electric or porcupine wires, netting barriers, and harassment could actually increase the risk of human health problems at other sites by causing the birds to move to other urban roosting sites not previously affected. This potential risk would be less likely under this alternative than Alternative 4 when people requesting assistance receive and accept WS' technical assistance recommendations. Because DRC-1339 would not be available for use by non-WS' personnel, it may be difficult to achieve local population reduction. In such cases, human health risks may remain the same or increase.

Alternative 4 -No Federal WS' Bird Damage Management

WS would have no impact on this issue. Management actions taken by non-federal entities to manage pigeons, starlings, and sparrows would be considered the *environmental status quo*.

With no WS' assistance, cooperators would be responsible for developing and implementing their own BDM program. Cooperator efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods, therefore leading to a greater potential of not reducing bird hazards compared with the proposed action. In some situations the implementation

of non-lethal controls such as electric or porcupine wires, netting barriers, and harassment could actually increase the risk of human health problems at other sites by causing the birds to move to other urban roosting sites not previously affected. Because DRC-1339 would not be available for use by non-WS' personnel, it may be difficult to achieve local population reduction. In such cases, human health risks may remain the same or increase. Under this alternative, human health problems could increase if private individuals were unable to find and implement effective means of controlling birds that cause damage problems.

4.1.4 Impacts to Stakeholders, Including Aesthetics

4.1.4.1 Effects on Human Affectionate Bonds With Individual Birds and On Aesthetic Values of Wild Bird Species

Alternative 1 - Integrated Bird Damage Management Program (Proposed Action / No Action)

Those who routinely view or feed individual birds such as pigeons would likely be disturbed by removal of such birds under the current program. WS is aware of such concerns and takes this into consideration to mitigate those affects. WS might be able to mitigate such concerns by leaving certain birds which might be identified by interested individuals.

Some people have expressed opposition to the killing of any birds during BDM activities. Under the proposed action alternative, some lethal control of birds would occur and those persons would be opposed. However, many persons who voice opposition have no direct connection or opportunity to view or enjoy the particular birds that would be killed by WS' lethal control activities. Lethal control actions would generally be restricted to local sites and to small, unsubstantial percentages of overall populations. Therefore, the species subjected to limited lethal control actions would remain common and abundant and would, therefore, continue to remain available for viewing by persons with that interest.

Lethal removal of birds from airports should not affect the public's enjoyment of the aesthetics of the environment since airport properties are closed to public access. The ability to view and interact with birds at these sites is usually either restricted to viewing from a location outside boundary fences or is forbidden.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage pigeons, starlings, and sparrows to stop damage with or without WS' assistance, WS' participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS' involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Alternative 2 - Non-lethal Bird Damage Management Only By WS

Under this alternative, WS would not conduct any lethal BDM but would still conduct harassment of birds that are causing damage. Some people who oppose lethal control of wildlife, but are tolerant of government involvement in non-lethal wildlife damage management, would favor this alternative. Persons who have developed affectionate bonds with individual wild birds would not be affected by the death of individual birds under this alternative, but might oppose dispersal or translocation of certain birds. WS may be able to mitigate such concerns by leaving certain birds that have been identified by interested individuals. In addition, the abundant populations of target bird species in urban environments would enable people to continue to view

them and to establish affectionate bonds with individual wild birds. Although WS would not perform any lethal activities under this alternative, other private entities would likely conduct BDM activities similar to those that would no longer be conducted by WS, which means the effects would then be similar to the proposed action alternative.

Alternative 3 - Technical Assistance Only

Under this alternative, WS would not conduct any direct operational BDM but would still provide technical assistance or self-help advice to persons requesting assistance with bird damage. WS would also not conduct any harassment of birds that were causing damage. Those who oppose direct operational assistance in wildlife damage management but favor technical assistance would favor this alternative. Persons who have developed affectionate bonds with individual wild birds would not be affected by WS' activities under this alternative because the individual birds would not be killed by WS. However, other private entities would likely conduct BDM activities similar to those that would no longer be conducted by WS, which means the effects would then be similar to the proposed action alternative.

Alternative 4 - No Federal WS' Bird Damage Management

Under this alternative, WS would not conduct any lethal removal of birds nor would the program conduct any harassment of birds. WS would have no impact on this issue. Management actions taken by non-federal entities to manage pigeons, starlings, and sparrows would be considered the *environmental status quo*.

Those in opposition of any involvement in wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild birds would not be affected by WS' activities under this alternative. However, other private entities would likely conduct BDM activities similar to those that would no longer be conducted by WS, which means the effects would then be similar to the proposed action alternative.

4.1.4.2 Effects on Aesthetic Values of Property Damaged by Birds

Alternative 1 - Integrated Bird Damage Management Program (Proposed Action/No Action)

Under this alternative, operational assistance in reducing bird problems, in which droppings from the birds cause unsightly mess, would improve aesthetic values of affected properties. In addition, individuals who object to the presence of invasive non-native species, such as starlings, pigeons, and sparrows, and whose aesthetic enjoyment of other birds is diminished by the presence of such species, will be positively affected by programs which result in reductions in the presence of such birds.

Relocation or dispersal of nuisance roosting or nesting populations of birds (e.g., blackbird/starling roosts) by harassment can sometimes result in the birds causing the same or similar problems at the new location. If WS is providing direct operational assistance in relocating such birds, coordination with local authorities may be conducted to assure they do not re-establish in other undesirable locations.

In those situations where a non-federal cooperator have already made the decision to remove or otherwise manage bird damage with or without WS' assistance, WS' participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS' involvement may actually have a *beneficial*

effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Alternative 2 - Non-lethal Bird Damage Management Only By WS

Under this alternative, WS would be restricted to non-lethal methods only. WS would not be able to implement lethal management actions in those situations where non-lethal methods are not effective at reducing damage to acceptable levels. In these situations bird damage would likely remain the same or possibly increase unless cooperators implemented their own damage management program. The success or failure of the use of non-lethal methods can be quite variable. If non-lethal methods alone are effective at reducing damage and conflicts, this alternative would improve aesthetic values of affected properties. Assuming property owners would choose to allow and pay for the implementation of these non-lethal methods, this alternative could result in birds relocating to other sites where they would likely cause or aggravate similar problems for other property owners. Thus, this alternative would likely result in more property owners experiencing adverse effects on the aesthetic values of their properties than the proposed action alternative.

Relocation or dispersal of nuisance roosting or nesting populations of birds (e.g., blackbird/starling roosts) by harassment can sometimes result in the birds causing the same or similar problems at the new location. If WS is providing direct operational assistance in relocating such birds, coordination with local authorities may be conducted to assure they do not reestablish in other undesirable locations.

Alternative 3 - Technical Assistance Only

Under this alternative, the lack of operational assistance in reducing bird problems could result in an increase of potential adverse affects on aesthetic values of affected properties. However, potential adverse affects would likely be less than as those under Alternative 4, since WS would be providing technical assistance. Relocation of nuisance roosting or nesting population of birds (e.g., blackbird/starling roosts) through harassment, barriers, or habitat alteration can sometimes result in the birds causing the same problems at the new location. If WS has only provided technical assistance, coordination with local authorities to monitor the birds' movements to assure the birds do not reestablish in other undesirable locations might not be conducted, thereby increasing the potential of adverse effects to nearby property owners.

Alternative 4 - No Federal WS' Bird Damage Management

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Under this alternative, the lack of any operational or technical assistance in reducing bird problems would mean aesthetic values of some affected properties would continue to be adversely affected if the property owners were not able to achieve BDM some other way. In many cases, this type of aesthetic damage would worsen because property owners would not be able to resolve their problems.

Relocation of nuisance roosting or nesting population of birds (e.g., blackbird/starling roosts) through harassment, barriers, or habitat alteration can sometimes result in the birds causing the same problems at the new location. Coordination of dispersal activities with local authorities to monitor the birds' movements to assure the birds do not reestablish in other undesirable locations

might not be conducted, thereby increasing the potential of adverse effects to nearby property owners.

4.1.5 Humaneness and Animal Welfare Concerns of Methods Used

4.1.5.1 Alternative 1 - Integrated Bird Damage Management Program (Proposed Action / No Action)

Under this alternative, methods viewed by some persons as inhumane would be used in BDM by WS. These methods would include shooting; live trapping/capture and euthanasia; and toxicants/chemicals such as DRC-1339 and Avitrol.

Shooting, when performed by experienced professionals, usually results in a quick death for target birds.

The primary lethal chemical BDM method that would be used by WS under this alternative would be DRC-1339. This chemical causes death from uremic poisoning and congestion of major organs (Decino et al. 1966). The birds become listless and lethargic, and a quiet death normally occurs in 24 to 72 hours following ingestion. However, the method appears to result in a less stressful death than that which probably occurs by most natural causes which are primarily disease, starvation, and predation. For those reasons, WS considers DRC-1339 use to be a relatively humane method of lethal BDM. However, despite the apparent painlessness of the effects of this chemical, some persons will view any method that takes a number of hours to cause death as inhumane and unacceptable. The chemical Avitrol repels birds by poisoning a few members of a flock, causing them to become hyperactive. Their distress calls generally alarm the other birds and cause them to leave the site. Only a small number of birds need to be affected to cause alarm in the rest of the flock. The affected birds generally die. In most cases where Avitrol is used, only a small percentage of the birds are affected and killed by the chemical with the rest being merely dispersed. In experiments to determine suffering, stress, or pain in affected animals Rowsell et al. (1979) tested Avitrol on pigeons and observed subjects for clinical, pathological, or neural changes indicative of pain or distress. None were observed. Conclusions of the study were that the chemical met the criteria for a humane pesticide. Notwithstanding, some persons would view Avitrol as inhumane treatment of the birds that are affected based on the birds' distress-like behavior.

Occasionally, birds captured alive by use of the tranquilizer alpha-chloralose, cage traps, by hand or with nets would be euthanized. The most common method of euthanasia would be by cervical dislocation or CO_2 gas which are described and approved by AVMA as humane euthanasia methods (Beaver et al. 2001). Most people would view AVMA approved euthanasia methods as humane.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage pigeons, starlings, and sparrows to stop damage with or without WS' assistance, WS' participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS' involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

4.1.5.2 Alternative 2 - Non-lethal Bird Damage Management Only By WS

Under this alternative, lethal methods viewed as inhumane by some persons would not be used by WS. However, it is expected that many requesters of BDM assistance would reject non-lethal

methods recommended by WS and/or would not be willing to pay the extra cost of implementing and maintaining them and would seek alternative lethal means. Since DRC-1339 would not be available to non-WS' entities, the only chemical BDM method that could be legally used by these entities would be Avitrol and Starlicide. Avitrol would most likely be viewed as less humane than DRC-1339 and Starlicide because of the distress behaviors that it causes. Similar to the proposed action shooting; and live trapping/capture and euthanasia by cervical dislocation or CO_2 gas could be used by these entities.

4.1.5.3 Alternative 3 - Technical Assistance Only

Under this alternative, WS would provide self-help advice only. Thus, lethal methods viewed as inhumane by some persons would not be used by WS. Without WS' direct operational assistance, it is expected that many requesters of BDM would reject non-lethal recommendations or would not be willing to pay the extra cost of implementing and maintaining them and would seek alternative lethal means. Similar to Alternative 2, DRC-1339 would no longer be available for use since it is only registered for use by or under the direct supervision of WS' personnel. Thus, the only chemical BDM methods legally available would be Avitrol and Starlicide. The use of Avitrol would be viewed by many persons as less humane than DRC-1339 and Starlicide.

4.1.5.4 Alternative 4 - No Federal WS' Bird Damage Management

Under this alternative, methods viewed as inhumane by some persons would not be used by WS. WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Similar to Alternative 2 and 3, DRC-1339 would no longer be available for use since it is only registered for use by or under the direct supervision of WS' personnel. Thus, the only chemical BDM methods legally available would be Avitrol and Starlicide. The use of Avitrol would be viewed by many persons as less humane than DRC-1339 and Starlicide. Similar to the proposed action shooting; and live trapping/capture and euthanasia by decapitation, cervical dislocation, or CO_2 gas could be used by these entities.

4.2 CUMULATIVE IMPACTS

Cumulative impacts, as defined by CEQ (40 CFR 1508.7), are impacts to the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts may result from individually minor, but collectively significant, actions taking place over time.

Under Alternatives 1, 2, and 3, WS would address damage associated with birds in a number of situations throughout the State. The WS' BDM program would be the primary federal program with BDM responsibilities; however, some state and local government agencies may conduct BDM activities in Alabama as well. Through ongoing coordination with these agencies, WS is aware of such BDM activities and may provide technical assistance in such efforts. WS does not normally conduct direct damage management activities concurrently with such agencies in the same area, but may conduct BDM activities at adjacent sites within the same time frame. In addition, commercial pest control companies may conduct BDM activities in the same area. The potential cumulative impacts analyzed below could occur either as a result of WS' BDM program activities over time, or as a result of the aggregate effects of those activities combined with the activities of other agencies and individuals.

4.2.1 Cumulative Impacts on Wildlife Populations

BDM methods used or recommended by the WS' program in Alabama will likely have no cumulative adverse effects on target and non-target wildlife populations. WS' limited lethal take of target bird species is anticipated to have minimal impacts on target bird populations in Alabama, the region and the U.S. When control actions are implemented by WS the potential lethal take of non-target wildlife species is expected to be minimal to non-existent.

4.2.2 Cumulative Impact Potential from Chemical Components

BDM programs which include the use of pesticides as a lethal population management component may have the greatest potential for cumulative impacts on the environment as such impacts relate to deposit of chemical residues in the physical environment and environmental toxicosis. The avicides, DRC-1339 and Starlicide, and the frightening agent, Avitrol, are the only chemicals used or recommended by the Alabama WS' BDM program for the purpose of obtaining lethal effects on birds. These chemicals have been evaluated for possible residual effects which might occur from buildup of the chemicals in soil, water, or other environmental sites.

DRC-1339 exhibits a low persistence in soil or water, and bioaccumulation of the chemical is unlikely (USDA 1997). Additionally, the relatively small quantity of DRC-1339 that will be used in BDM programs in Alabama, the chemical's instability which results in speedy degradation of the product, and application protocol used in WS' programs further reduces the likelihood of any environmental accumulation. DRC-1339 is not used by any other entities in Alabama.

Starlicide is similar to DRC-1339 used in feedlots; however, it contains 0.1% DRC-1339 (USDA 1997, Appendix P). Therefore, the cumulative impact potential from Starlicide use should be similar to DRC-1339.

Avitrol may be used or recommended by the Alabama WS' program. Most applications would not be in contact with soil, applications would not be in contact with surface or ground water, and uneaten baits will be recovered and disposed of according to EPA label specifications. Avitrol exhibits a high persistence in soil and water but, according to literature, does not bioaccumulate (USDA 1997, EXTOXNET 2000). Because of Avitrol's characteristic of binding to soils, it is not expected to be present in surface or ground water as a result of its use on land (EPA 1980). A combination of chemical characteristics and baiting procedures used by WS would reduce the likelihood of environmental accumulation of Avitrol. The EPA has not required studies on the fate of Avitrol in the soil because, based on use patterns of the avicide, soil residues are expected to be low (EPA 1980).

Based on use patterns, the chemical and physical characteristics of DRC-1339, Starlicide, and Avitrol, and factors related to the environmental fate of these pesticides, no cumulative impacts are expected from the lethal chemical components used or recommended by the WS' BDM program in Alabama.

Non-lethal chemicals may also be used or recommended by the WS' BDM program in Alabama. Characteristics of these chemicals and use patterns indicate that no significant cumulative impacts related to environmental fate are expected from their use in WS' BDM programs in Alabama.

4.2.3 Cumulative Impact Potential from Non-chemical Components

Non-chemical methods used or recommended by the WS' BDM program may include exclusion through use of various barriers, habitat modification of structures or vegetation, live trapping and translocation or euthanasia of birds, harassment of birds or bird flocks, and shooting.

Because shooting may be considered as a component of the non-chemical, the deposition of lead shot in the environment is a factor considered in this EA.

Lead Shot. Threats of lead toxicosis to waterfowl from the deposition of lead shot in waters where such species fed were observed more than one hundred years ago (Sanderson and Belrose 1986). As a result of discoveries made regarding impacts to several species of ducks and geese, federal restrictions were placed on the use of lead shot for waterfowl hunting in 1991. Beginning September 1, 1991, the contiguous 48 United States, and the States of Alaska and Hawaii, the Territories of Puerto Rico and the Virgin Islands, and the territorial waters of the United States, are designated for the purpose of Sec. 20.21 (j) as nontoxic shot zones for hunting waterfowl, coots, and certain other species. "Certain other species" refers to those species, other than waterfowl or coots, affected by reason of being included in aggregate bags and concurrent seasons.

All WS' BDM shooting activities conform to federal, state and local laws. If activities are conducted near or over water, WS uses steel shot during those activities. Consequently, no deposition of lead in nontoxic shot zones is likely to occur as a result of WS' BDM actions in Alabama. Therefore, cumulative impacts are not likely to occur if toxic shot is used. Additionally, WS will evaluate other BDM actions which entail the use of shot on a case by case basis to determine if deposition of lead shot poses any risk to non-target animals, such as domestic livestock. If such risk exists, WS will use nontoxic shot in those situations.

Harassment/Relocation. Some potential exists for cumulative impacts to human health and safety related to the harassment of roosting bird flocks such as blackbirds, crows and European Starlings in urban environments. If birds are dispersed from one site and relocate to another where human exposure to concentrations of bird droppings over time occurs, human health and safety could be threatened. If WS is providing direct operational assistance in relocating such birds, coordination with local authorities may be conducted to assure they do not re-establish in other undesirable locations.

4.3 SUMMARY

No significant cumulative environmental impacts are expected from any of the 4 alternatives.

Under the Proposed Action, the lethal removal of birds by WS would not have a significant impact on overall blackbird, Mourning Dove, crow, starling, pigeon, vulture, and sparrow populations in Alabama, but some local reductions may occur. No risk to public safety is expected from methods used by WS or recommended in Alternatives 1, 2, and 3, since only trained and experienced WS' personnel would conduct and recommend BDM activities. There is a slight increased risk to public safety when persons who reject WS' assistance and recommendations in Alternatives 1, 2 and 3 and conduct their own BDM activities, and when no WS' assistance is provided in Alternative 4. In all 4 Alternatives, however, it would not be to the point that the impacts would be significant.

Under Alternative 4, management actions taken by non-federal entities to manage bird damage would be considered the *environmental status quo*. In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage pigeons, starlings, and sparrows to stop damage with or without WS' assistance in Alternatives 1, 2, and 3, WS' participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS' involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Although some persons will likely be opposed to WS' participation in BDM activities on public and private lands within the state of Alabama, the analysis in this EA indicates that WS' Integrated BDM

program will not result in significant cumulative adverse impacts on the quality of the human environment. Table 4-3 summarizes the expected impact of each of the alternatives on each of the issues.

Table 4-3. Summary of expected effects of each of the alternatives on each of the issues.

Issues	*Alt. 1 Integrated BDM Program (Proposed/No Action)*	*Alt. 2 Non-lethal BDM Only by WS*	*Alt. 3 Technical Assistance Only*	*Alt. 4 No Federal WS' BDM Management*
Target Species Effects	Low effect - reductions in local target bird numbers; would not significantly affect state and regional populations.	Low effect - reductions in local target bird numbers by non-WS' personnel likely; would not significantly affect state and regional populations.	No effect by WS. Low effect - reductions in local target bird numbers by non-WS' personnel likely; would not significantly affect state and regional populations.	No effect by WS. Low effect - reductions in local target bird numbers by non-WS' personnel likely; would not significantly affect state and regional populations.
Effects on other wildlife species, including T&E species	Low effect - methods used by WS would be highly selective with very little risk to non-target species.	Low effect - methods used by WS would be highly selective with very little risk to non-target species.	No effect by WS. Impacts by non-WS' personnel would be variable.	No effect by WS. Impacts by non-WS' personnel would be variable.
Effects on Human Health and Safety - Effects of BDM Methods on Human Health	Low risk - methods used by WS would be safe with no probable risk to human health or safety.	Low risk - methods used by WS would be safe with no probable risk to human health or safety.	No effect by WS. Impacts by non-WS' personnel would be variable.	No effect by WS. Impacts by non-WS' personnel would be variable.
Effects on Human Health and Safety from Birds	The proposed action has the greatest potential of successfully reducing this risk	Impacts could be greater under this alternative than the proposed action	Efforts by non-WS' personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater potential of not reducing bird damage than under the proposed action.	Efforts by non-WS' personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater potential of not reducing bird damage than under the proposed action.
Aesthetic Enjoyment of Birds	Low to Moderate effect at the local levels; Some local populations may be reduced; WS' BDM activities do not adversely affect overall regional or state target bird populations.	Low to moderate effect. Local bird numbers in damage situations would remain high or possibly increase when non-lethal methods are ineffective unless non-WS' personnel successfully implement lethal methods; no adverse affect on overall regional and state target bird populations.	Low to moderate effect. Local bird numbers in damage situations would remain high or possibly increase unless non-WS' personnel successfully implement lethal methods; no adverse affect on overall regional and state target bird populations	Low to moderate effect. Local bird numbers in damage situations would remain high or possibly increase unless non-WS' personnel successfully implement lethal methods; no adverse affect on overall regional and state target bird populations
Aesthetic Damage Caused by Birds	Low effect - bird damage problems most likely to be resolved without creating or moving problems elsewhere.	Moderate to high effect. Birds may move to other sites which can create aesthetic damage problems at new sites. Less likely than Alt. 3 and 4.	Moderate to high effect. Birds may move to other sites which can create aesthetic damage problems at new sites.	High effect. Bird problems less likely to be resolved without WS' involvement. Birds may move to other sites which can create aesthetic damage problems at new sites.
Humaneness and Animal Welfare Concerns of Methods Used	Low to moderate effect. Methods viewed by some people as inhumane would be used by WS.	Lower effect than Alt. 1 since only non-lethal methods would be used by WS	No effect by WS. Impacts by non-WS' personnel would be variable	No effect by WS. Impacts by non-WS' personnel would be variable

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APPENDIX A

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APPENDIX B

BIRD DAMAGE MANAGEMENT (BDM) METHODS AVAILABLE FOR USE OR RECOMMENDATION BY THE ALABAMA WS' PROGRAM

NON-LETHAL METHODS - NONCHEMICAL

Agricultural producer and property owner practices. These consist primarily of non-lethal preventive methods such as cultural methods and habitat modification. Cultural methods and other management techniques are implemented by the agricultural producer or property owners/managers. Resource owners/managers may be encouraged to use these methods, based on the level of risk, need, and professional judgment on their effectiveness and practicality. These methods include:

Cultural methods. These may include altering planting dates so that crops are not young and more vulnerable to damage when the damage-causing species is present, or the planting of crops that are less attractive or less vulnerable to such species. At feedlots or dairies, cultural methods generally involve modifications to the level of care or attention given to livestock which may vary depending on the age and size of the livestock. Animal husbandry practices include but are not limited to techniques such as night feeding, indoor feeding, closed barns or corrals, removal of spilled grain or standing water, and use of bird proof feeders (Johnson and Glahn 1994).

Environmental/Habitat modification can be an integral part of BDM. Wildlife production and/or presence are directly related to the type, quality, and quantity of suitable habitat. Therefore, habitat can be managed to reduce or eliminate the production or attraction of certain bird species or to repel certain birds. In most cases, the resource or property owner is responsible for implementing habitat modifications, and WS only provides advice on the type of modifications that have the best chance of achieving the desired effect. Habitat management is most often a primary component of BDM strategies at or near airports to reduce bird aircraft strike problems by eliminating bird nesting, roosting, loafing, or feeding sites. Generally, many bird problems on airport properties can be minimized through management of vegetation and water from areas adjacent to aircraft runways. Habitat management is often necessary to minimize damage caused by crows, blackbirds, and starlings that form large roosts during late autumn and winter. Bird activity can be greatly reduced at roost sites by removing all the trees or selectively thinning the stand.

Animal behavior modification. This refers to tactics that alter the behavior of wildlife to reduce damage. Animal behavior modification may involve use of scare tactics or fencing to deter or repel animals that cause loss or damage (Twedt and Glahn 1982). Some but not all methods that are included by this category are:

- X Bird-proof barriers
- X Electronic guards
- X Propane exploders
- X Pyrotechnics
- X Distress Calls and sound producing devices
- X Chemical frightening agents
- X Repellents
- X Scare crows
- X Mylar tape
- X Lasers
- X Eye-spot balloons

These techniques are generally only practical for small areas. Scaring devices such as distress calls, helium filled eye spot balloons, raptor effigies and silhouettes, mirrors, and moving disks can be effective but usually for only a short time before birds become accustomed and learn to ignore them (Arhart 1972, Rossbach 1975, Conover 1982, Shirota and Masake 1983, Schmidt and Johnson 1984, Mott 1985, Graves and Andelt 1987, Bomford 1990). Mylar tape has produced mixed results in its effectiveness to frighten birds (Dolbeer et al. 1986, Tobin et al. 1988).

Bird proof barriers can be effective but are often cost-prohibitive, particularly because of the aerial mobility of birds which requires overhead barriers as well as peripheral fencing or netting. Exclusion adequate to stop bird movements can also restrict movements of livestock, people and other wildlife (Fuller-Perrine and Tobin 1993).

Overhead wire grids can deter crow use of specific areas where they are causing a nuisance (Johnson 1994). The birds apparently fear colliding with the wires and thus avoid flying into areas where the method has been employed. Netting can be used to exclude birds from a specific area by the placement of bird proof netting over and around the specific resource to be protected. Exclusion may be impractical in most settings (e.g., commercial agriculture), however it can be practical in small areas (e.g., personal gardens) or for high-value crops (e.g., grapes) (Johnson 1994). Although this alternative would provide short-term relief from damage, it may not completely deter birds from feeding, loafing, staging, or roosting at that site. A few people would find exclusionary devices such as netting unsightly, trashy, and a lowering of the aesthetic value of the neighborhood when used over personal gardens.

Auditory scaring devices such as propane exploders, pyrotechnics, electronic guards, scare crows, and audio distress/predator vocalizations are effective in many situations for dispersing damage-causing bird species. These devices are sometimes effective but usually only for a short period of time before birds become accustomed and learn to ignore them (Arhart 1972, Rossbach 1975, Shirota and Masake 1983, Schmidt and Johnson 1984, Mott 1985, Bomford 1990). Williams (1983) reported an approximate 50% reduction in blackbirds at two south Texas feedlots as a result of pyrotechnics and propane cannon use. However, they are often not practical in dairy or feedlot situations because of the disturbance to livestock, although livestock can generally be expected to habituate to the noise. Birds, too, quickly learn to ignore scaring devices if the birds' fear of the methods is not reinforced with shooting or other tactics.

Visual scaring techniques such as use of Mylar tape (highly reflective surface produces flashes of light that startles birds), eye-spot balloons (the large eyes supposedly give birds a visual cue that a large predator is present), flags, effigies (scarecrows), sometimes are effective in reducing bird damage. Mylar tape has produced mixed results in its effectiveness to frighten birds (Dolbeer et.al. 1986, and Tobin et.al. 1988). Birds quickly learn to ignore visual and other scaring devices if the birds' fear of the methods is not reinforced with shooting or other tactics.

Lasers are a non-lethal technique recently evaluated by the USDA, APHIS, WS, National Wildlife Research Center (NWRC) (Glahn et al. 2000, Blackwell et al. 2002). For best results and to disperse numerous birds from a roost, the laser is most effectively used in periods of low light, such as after sunset and before sunrise. In the daytime, the laser can also be used during overcast conditions or in shaded areas to move individual and small numbers of birds, although the effective range of the laser is much diminished. Blackwell et al. (2002) tested lasers on several bird species and observed varied results among species. Lasers were ineffective at dispersing pigeons and mallard with birds habituating in approximately 5 minutes and 20 minutes, respectively (Blackwell et al. 2002). As with other BDM tools lasers are most effective when used as part of an integrated management program.

Live traps (although live traps are non-lethal, birds may be euthanized upon capture). In most situations live trapped birds are subsequently euthanized. Relocation to other areas following live capture would not generally be effective because problem bird species are highly mobile and can easily return to damage

sites from long distances; habitats in other areas are generally already occupied; and relocation would most likely result in bird damage problems at the new location. Translocation of wildlife is also discouraged by WS' policy (WS Directive 2.501) because of stress to the relocated animal, poor survival rates, and difficulties in adapting to new locations or habitats. Live traps include:

Decoy traps are used by WS for preventive and corrective damage management. Decoy traps are similar in design to the Australian Crow Trap as reported by McCracken (1972) and Johnson and Glahn (1994). Live decoy birds of the same species that are being targeted are usually placed in the trap with sufficient food and water to assure their survival. Perches are configured in the trap to allow birds to roost above the ground and in a more natural position. Feeding behavior and calls of the decoy birds attract other birds which enter and become trapped themselves. Active decoy traps are monitored daily, every other day, or as appropriate, to remove and euthanize excess birds and to replenish bait and water. Decoy traps and other cage/live traps, as applied and used by WS, pose no danger to pets or the public and if a pet is accidentally captured in such traps, it can be released unharmed.

Foot-hold traps are used by WS for preventative and corrective damage management. Trapping with foot-hold traps can be effective in areas where a small resident crow population is present (Johnson 1994). No. 0 or 1 foot-hold traps with padded jaws would be used to trap individual birds in areas habitually used by crows. Traps would be monitored a minimum of twice each day and trapped birds euthanized by methods approved by the AVMA or a veterinarian.

Nest box traps may be used by WS for corrective damage management and are effective in capturing local breeding and post breeding European Starlings and other targeted secondary cavity nesting birds (DeHaven and Guarino 1969, Knittle and Guarino 1976).

Mist nets are more commonly used for capturing small-sized birds such as House Sparrows but can be used to capture larger birds such as ducks and ring-neck pheasants or even smaller nuisance hawks and owls. It was introduced in to the United States in the 1950's from Asia and the Mediterranean where it was used to capture birds for the market (Day et al. 1980). The mist net is a fine black silk or nylon net usually 3 to 10 feet wide and 25 to 35 feet long. Net mesh size determines which birds can be caught and overlapping pockets in the net cause birds to entangle themselves when they fly into the net.

Cannon nets are normally used for larger birds such as pigeons and use mortar projectiles to propel a net up and over birds which have been baited to a particular site.

Nest destruction is the removal of nesting materials during the construction phase of the nesting cycle. Nest destruction is generally only applied when dealing with a single bird or very few birds. This method is used to discourage birds from constructing nests in areas which may create nuisances for home and business owners. Heusmann and Bellville (1978) reported that nest removal was an effective but time-consuming method because problem bird species are highly mobile and can easily return to damage sites from long distances, or because of high populations. This method poses no imminent danger to pets or the public.

Egg addling/destruction is a method of suppressing reproduction in local nuisance bird populations by destroying egg embryos prior to hatching. Egg addling is conducted by vigorously shaking an egg numerous times which causes detachment of the embryo from the egg sac. Egg destruction can be accomplished in several different ways, but the most commonly used methods are manually gathering eggs and breaking them, or by oiling or spraying the eggs with a liquid which covers the entire egg and prevents the egg from obtaining oxygen (see *Egg oiling* below). Although WS does not commonly use

egg addling or destruction, it is a valuable damage management tool and has proven effective in some applications.

Lure crops/alternate foods. When damage cannot be avoided by careful crop selection or modified planting schedules, lure crops can sometimes be used to mitigate the loss potential. Lure crops are planted or left for consumption by wildlife as an alternative food source. This approach provides relief for critical crops by sacrificing less important or specifically planted fields. Establishing lure crops is sometimes expensive, requires considerable time and planning to implement, and may attract other unwanted species to the area.

NON-LETHAL METHODS - CHEMICAL

Avitrol is a chemical frightening agent (repellent) that is effective in a single dose when mixed with untreated baits, normally in a 1:9 ratio. Avitrol, however, is not completely non-lethal in that a small portion of the birds are generally killed (Johnson and Glahn 1994). Prebaiting is usually necessary to achieve effective bait acceptance by the target species. This chemical is registered for use on pigeons, crows, blackbirds, starlings, and House Sparrows in various situations. Avitrol treated bait is placed in an area where the targeted birds are feeding. When a treated particle is consumed affected bird begins to broadcast distress vocalizations and display abnormal flying behavior, thereby frightening the remaining flock away.

Avitrol is a restricted use pesticide that can only be sold to certified applicators and is available in several bait formulations where only a small portion of the individual grains carry the chemical. It can be used during anytime of the year, but is used most often during winter and spring. Any granivorous bird associated with the target species could be affected by Avitrol. Avitrol is water soluble, but laboratory studies demonstrated that Avitrol is strongly absorbed onto soil colloids and has moderately low mobility. Biodegradation is expected to be slow in soil and water, with a half-life ranging from three to 22 months. However, Avitrol may form covalent bonds with humic materials, which may serve to reduce its availability for intake by organisms from water, is non-accumulative in tissues and rapidly metabolized by many species (Schafer 1991).

Avitrol is acutely toxic to avian and mammalian species, however, blackbirds are more sensitive to the chemical and there is little evidence of chronic toxicity. Laboratory studies with predator and scavenger species have shown minimal potential for secondary poisoning and during field use only magpies and crows appear to have been affected (Schafer 1991). However, a laboratory study by Schafer et al. (1974) showed that magpies exposed to two to 3.2 times the published LD_{50} in contaminated prey for 20 days were not adversely affected and three American kestrels that were fed contaminated blackbirds for seven to 45 days were not adversely affected. Some hazards may occur to predatory species consuming unabsorbed chemical in the GI tract of affected or dead birds (Schafer 1981, Holler and Shafer 1982). A formal Risk Assessment found no probable risk is expected for pets and the public, based on low concentrations and low hazards quotient value for non-target indicator species tested on this compound (USDA 1997, Appendix P).

Methyl anthranilate (artificial grape flavoring used in foods and soft drinks for human consumption) could be used or recommended by WS as a bird repellent. Methyl anthranilate (MA) (artificial grape flavoring food additive) has been shown to be a promising repellent for many bird species, including waterfowl (Dolbeer et al. 1993). Cummings et al. (1995) found effectiveness of MA declined significantly after 7 days. Belant et al. (1996) found MA ineffective as a bird grazing repellent, even when applied at triple the recommended label rate. MA is also under investigation as a potential bird taste repellent. MA may become available for use as a livestock feed additive (Mason et al. 1984; Mason et al. 1989). It is registered for applications to turf or to surface water areas used by unwanted birds. The

material has been shown to be nontoxic to bees (LD_{50} > 25 micrograms/bee[8]), nontoxic to rats in an inhalation study (LC_{50} > 2.8 mg/L[9]), and of relatively low toxicity to fish and other invertebrates. Methyl anthranilate is naturally occurring in concord grapes and in the blossoms of several species of flowers and is used as a food additive and perfume ingredient (Dolbeer et al. 1992). It has been listed as "Generally Recognized as Safe" (GRAS) by the U.S. Food and Drug Administration (FDA) (Dolbeer et al. 1992).

Water surface and turf applications of MA are generally considered expensive. For example, the least intensive application rate required by label directions is 20 lbs. of product (8 lbs. active ingredient) per acre of surface water at a cost of about $64/lb. with retreating required every 3-4 weeks. Cost of treating turf areas would be similar on a per acre basis. Also, MA completely degrades in about 3 days when applied to water which indicates the repellent effect is short-lived.

Another potentially more cost effective method of MA application is by use of a fog-producing machine (Vogt 1997). The fog drifts over the area to be treated and is irritating to the birds while being non-irritating to any humans that might be exposed. Fogging applications must generally be repeated 3-5 times after the initial treatment before the birds abandon a treatment site (Dr. P. Vogt, RJ Advantage, Inc., pers. comm. 1997). Applied at a rate of about .25 lb/acre of water surface, the cost is considerably less than when using the turf or water treatment methods.

MA is also being investigated as a livestock feed additive to reduce or prevent feed consumption by birds. Such chemicals undergo rigorous testing and research to prove safety, effectiveness, and low environmental risks before they would be registered by EPA or the FDA.

Mesurol was recently registered by WS to repel crows and ravens from bird nests of T&E species. It could be used by WS only as a bird repellent to deter predation by crows on eggs of threatened or endangered species. Dimmick and Nicolaus (1990) showed breeding pairs of crows could be conditioned with aversive chemicals to avoid eggs. However, Avery and Decker (1994) observed increased consumption of eggs treated with higher doses of Mesurol by Fish Crows. Sullivan and Dinsmore (1990) reported bird nests greater than 700 meters from crow nests were relatively safe from crow predation, thus nests beyond 700 meters from active crow nests may not need to be treated.

WS would treat eggs similar in appearance as those eggs of the species needing protection. The active ingredient is injected into eggs which are placed in artificial nests or upon elevated platforms. Upon ingestion, birds develop post-ingestional malaise (Mason 1989) and crows develop an aversion to consuming similar looking eggs (Dimmick and Nicolaus 1990). Repeated exposures may be necessary to develop and maintain aversion to threatened or endangered species eggs as the learning curve for crows can take from 23 days to 3 months (Dimmick and Nicolaus 1990, Avery and Decker 1994).

Treated areas will be posted with warning signs at access points to exclude people from endangered or threatened species nesting areas. Treated eggs are not placed in locations where threatened or endangered species may eat the treated eggs. Mesurol is highly toxic to birds and mammals and toxic to fish. It is also highly toxic to honey bees.

Particulate feed additives have been investigated for their bird-repellent characteristics. In pen trials, European Starlings rejected grain to which charcoal particles were adhered (L. Clark, USDA/APHIS/WS-NWRC, pers. comm. 1999). If further research finds this method to be effective and economical in field application, it might become available as a bird repellent on livestock feed. Charcoal feed additives have been explored for use in reducing methane production in livestock and should have no adverse effects on

[8] An LD_{50} is the dosage in milligrams of material per kilogram of body weight, or, in this case in micrograms per individual bee, required to cause death in 50% of a test population of a species.

[9] An LC_{50} is the dosage in milligrams of material per liter of air required to cause death in 50% of a test population of a species through inhalation.

livestock, on meat or milk production, or on human consumers of meat or dairy products (L. Clark, USDA/APHIS/WS-NWRC, pers. comm. 1999).

Other chemical repellents. A number of other chemicals have shown bird repellent capabilities. Anthraquinone, a naturally occurring chemical found in many plant species and in some invertebrates as a natural predator defense mechanism, has shown effectiveness in protecting rice seed from Red-winged Blackbirds and Boat-tailed Grackles (Avery et al. 1997). It has also shown effectiveness as a foraging repellent against Canada goose grazing on turf and as a seed repellent against brown-headed cowbirds (Dolbeer et al. 1998). Compounds extracted from common spices used in cooking and applied to perches in cage tests have been shown repellent characteristics against roosting European Starlings (Clark 1997). Naphthalene (moth balls) was found to be ineffective in repelling European Starlings (Dolbeer et al. 1988).

Tactile repellents. A number of tactile repellent products are on the market which reportedly deters birds from roosting on certain structural surfaces by presenting a tacky or sticky surface that the birds avoid. However, experimental data in support of this claim are sparse (Mason and Clark 1992). The repellency of tactile products is generally short-lived because of dust, and they sometimes cause aesthetic problems and expensive clean-up costs by running down the sides of buildings in hot weather.

Alpha-chloralose is a central nervous system depressant used as an immobilizing agent to capture and remove pigeons, waterfowl and other birds. It is labor intensive and in some cases, may not be cost effective (Wright 1973, Feare et al. 1981). Alpha-chloralose is typically delivered in a well contained bait in small quantities with minimal hazards to pets and humans; single bread or corn baits are fed directly to the target birds. WS' personnel are present at the site of application during baiting to retrieve the immobilized birds. Unconsumed baits are removed from the site following each treatment. Alpha-chloralose was eliminated from more detailed analysis in USDA (1997) based on critical element screening; therefore, environmental fate properties of this compound were not rigorously assessed. However, the solubility and mobility are believed to be moderate and environmental persistence is believed to be low. Bioaccumulation in plants and animal tissue is believed to be low. Alpha-chloralose is used in other countries as an avian and mammalian toxicant. The compound is slowly metabolized, with recovery occurring a few hours after administration (Schafer 1991). The dose used for immobilization is designed to be about two to 30 times lower than the LD_{50}. Mammalian data indicate higher LD_{50} values than birds. Toxicity to aquatic organisms is unknown (Woronecki et al. 1990) but the compound is not generally soluble in water and therefore should remain unavailable to aquatic organisms. Factors supporting the determination of this low potential included the lack of exposure to pets, non-target species and the public, and the low toxicity of the active ingredient. Other supporting rationale for this determination included relatively low total annual use and a limited number of potential exposure pathways. The agent is currently approved for use by WS as an Investigative New Animal Drug by the FDA rather than a pesticide.

Egg oiling is a method for suppressing reproduction of nuisance birds by spraying a small quantity of food grade vegetable oil or mineral oil on eggs in nests. The oil prevents exchange of gases and causes asphyxiation of developing embryos and has been found to be 96-100% effective in reducing hatchability. (Pochop 1998, Pochop et al. 1998). The method has an advantage over nest or egg destruction in that the incubating birds generally continue incubation and do not re-nest. The EPA has ruled that use of corn oil for this purpose is exempt from registration requirements under FIFRA. To be most effective, the oil should be applied anytime between the fifth day after the laying of the last egg in a nest and at least five days before anticipated hatching. This method is extremely target specific and is less labor intensive than egg addling.

LETHAL METHODS - MECHANICAL

Shooting is more effective as a dispersal technique than as a way to reduce bird densities when large numbers of birds are present. Normally shooting is conducted with shotguns, rifles or air rifles. Shooting is a very individual specific method and is normally used to remove a single offending bird. However, at times, a few birds could be shot from a flock to make the remainder of the birds more wary and to help reinforce non-lethal methods. Shooting can be relatively expensive because of the staff hours sometimes required (USDA 1997). It is selective for target species and may be used in conjunction with the use of spotlights, decoys, and calling. Shooting with shotguns, air rifles, or rim and center fire rifles is sometimes used to manage bird damage problems when lethal methods are determined to be appropriate. The birds are killed as quickly and humanely as possible. All firearm safety precautions are followed by WS when conducting BDM activities and all laws and regulations governing the lawful use of firearms are strictly complied with.

Firearm use is very sensitive and a public concern because of safety issues relating to the public and misuse. To ensure safe use and awareness, WS' employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS' employees, who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

Sport hunting is sometimes recommended by WS as a viable damage management method when the target species can be legally hunted. A valid hunting license and other licenses or permits may be required by the Alabama Department of Wildlife and Freshwater Fisheries and USFWS for certain species. This method provides sport and food for hunters and requires no cost to the landowner. Sport hunting is occasionally recommended if it can be conducted safely for crow damage management around crops or other resources.

Cervical dislocation is sometimes used to euthanize birds which are captured in live traps. The bird is stretched and the neck is hyper-extended and dorsally twisted to separate the first cervical vertebrae from the skull. The AVMA approves this technique as a humane method of euthanasia and states that cervical dislocation when properly executed is a humane technique for euthanasia of poultry and other small birds (Beaver et al. 2001). Cervical dislocation is a technique that may induce rapid unconsciousness, does not chemically contaminate tissue, and is rapidly accomplished (Beaver et al. 2001).

Snap traps are modified rat snap traps used to remove individual European Starlings, and other cavity using birds. The trap treadle is baited with peanut butter or other food attractants and attached near the damage area caused by the offending bird. These traps pose no imminent danger to pets or the public, and are usually located in positions inaccessible to people and most non-avian animals. They are very selective because they are usually set in the defended territory of the target birds.

LETHAL METHODS - CHEMICAL

All chemicals used by WS are registered as required by the FIFRA (administered by the EPA and the Alabama Department of Agriculture and Industries, Pesticide Management Division). WS' personnel that use restricted-use chemical methods are certified as pesticide applicators by the State of Alabama and are required to adhere to all certification requirements set forth in FIFRA and Alabama pesticide control laws and regulations. Chemicals are only used on private, public, or tribal property sites with authorization from the property owner/manager.

CO_2 is sometimes used to euthanize birds which are captured in live traps. Live birds are placed in a container such as a plastic 5-gallon bucket or chamber and sealed shut. CO_2 gas is released into the bucket or chamber and birds quickly die after inhaling the gas. This method is approved as a euthanizing agent by the AVMA (Beaver et al. 2001). CO_2 gas is a byproduct of animal respiration, is common in the atmosphere, and is required by plants for photosynthesis. It is used to carbonate beverages for human consumption and is also the gas released by dry ice. The use of CO_2 by WS for euthanasia purposes is exceedingly minor and inconsequential to the amounts used for other purposes by society.

DRC-1339 is the principal chemical method that would be used for bird damage management in the proposed action. For more than 30 years, DRC-1339 has proven to be an effective method of starling, blackbird, gull, and pigeon control at feedlots, dairies, airports, and in urban areas (Decino et al. 1966, Besser et al. 1967, West et al. 1967). Studies continue to document the effectiveness of DRC-1339 in resolving blackbird/starling problems at feedlots (West and Besser 1976, Glahn 1982, Glahn et al. 1987), dispersing crow roosts in urban/suburban areas (Boyd and Hall 1987), and Blanton et al. (1992) reports that DRC-1339 appears to be a very effective, selective, and safe means of urban pigeon population reduction. Glahn and Wilson (1992) noted that baiting with DRC-1339 is a cost-effective method of reducing damage by blackbirds to sprouting rice.

DRC-1339 is a slow acting avicide that is registered with the EPA for reducing damage from several species of birds, including blackbirds, starlings, pigeons, crows, ravens, magpies, and gulls. DRC-1339 was developed as an avicide because of its differential toxicity to mammals. DRC-1339 is highly toxic to sensitive species but only slightly toxic to non-sensitive birds, predatory birds, and mammals (Schafer 1981, Schafer 1991, Johnson et al. 1999). For example, starlings, a highly sensitive species, require a dose of only 0.3 mg/bird to cause death (Royall et al. 1967). Most bird species that are responsible for damage, including starlings, blackbirds, pigeons, crows, magpies, and ravens are highly sensitive to DRC-1339. Many other bird species such as raptors (Schafer 1981), sparrows, and eagles are classified as non-sensitive. Numerous studies show that DRC-1339 poses minimal risk of primary poisoning to non-target and T&E species (USDA 1997). Secondary poisoning has not been observed with DRC-1339 treated baits, except crows eating gut contents of pigeons (Kreps 1974). During research studies, carcasses of birds which died from DRC-1339 were fed to raptors and scavenger mammals for 30 to 200 days with no symptoms of secondary poisoning observed (Cunningham et al. 1981). This can be attributed to relatively low toxicity to species that might scavenge on blackbirds and starlings killed by DRC-1339 and its tendency to be almost completely metabolized in the target birds which leaves little residue to be ingested by scavengers. Secondary hazards of DRC-1339 are almost nonexistent (Schafer 1984, Schafer 1991, Johnson et al. 1999). DRC-1339 acts in a humane manner producing a quiet and apparently painless death.

Table C-1. DRC-1339 Used by Alabama WS.

FY	Species	Quantity Used (grams)
2005	Pigeons	23
2004	Pigeons	34
2003	Pigeons	191
2002	Pigeons	26
2001	Pigeons	34
2000	European Starlings	34
	Pigeons	116
1999	Pigeons	9

DRC-1339 is unstable in the environment and degrades rapidly when exposed to sunlight, heat, or ultra violet radiation. DRC-1339 is highly soluble in water but does not hydrolyze and degradation occurs rapidly in water. DRC-1339 tightly binds to soil and has low mobility. The half life is about 25 hours, which means it is nearly 100% broken down within a week, and identified metabolites (i.e., degradation chemicals) have low toxicity. Aquatic and invertebrate toxicity is low (USDA 1997). Appendix P of USDA (1997) contains a thorough risk assessment of DRC-1339 and the reader is referred to that source for a more complete

discussion. That assessment concluded that no adverse effects are expected from use of DRC-1339.

DRC-1339 has several EPA Registration Labels (56228-10, 56228-17, 56228-28, 56228-29, and 56228-30) depending on the application or species involved in the bird damage management project. Alabama WS used or supervised the use of a total of 467 grams of DRC-1339 over the past 7 years (Table C-1) (USDA-WS MIS Database and Controlled Materials Inventory Tracking System).

APPENDIX C

THREATENED AND ENDANGERED SPECIES THAT ARE FEDERALLY LISTED (OR CANDIDATE SPECIES) IN THE STATE OF ALABAMA

Animals -- 98

Status	Species/Listing Name
E	Acornshell, southern (*Epioblasma othcaloogensis*)
T	Bankclimber, purple (mussel) (*Elliptoideus sloatianus*)
E	Bat, gray (*Myotis grisescens*)
E	Bat, Indiana (*Myotis sodalis*)
E	Bean, Cumberland (pearlymussel) Entire Range; Except where listed as Experimental Populations (*Villosa trabalis)*
E	Beetle, American burying (*Nicrophorus americanus*)
E	Blossom, tubercled (pearlymussel) Entire Range; Except where listed as Experimental Populations (*Epioblasma torulosa torulosa*)
E	Blossom, turgid (pearlymussel) Entire Range; Except where listed as Experimental Populations *(Epioblasma turgidula)*
E	Blossom, yellow (pearlymussel) Entire Range; Except where listed as Experimental Populations *(Epioblasma florentina florentina)*
E	Campeloma, slender *(Campeloma decampi)*
E	Catspaw (purple cat's paw pearlymussel) Entire Range; Except where listed as Experimental Populations *(Epioblasma obliquata obliquata*)
E	Cavefish, Alabama *(Speoplatyrhinus poulsoni)*
T	Chub, spotfin Entire *(Erimonax monachus)*
E	Clubshell Entire Range; Except where listed as Experimental Populations *(Pleurobema clava)*
E	Clubshell, black *(Pleurobema curtum)*
E	Clubshell, ovate *(Pleurobema perovatum)*
E	Clubshell, southern *(Pleurobema decisum)*
E	Combshell, Cumberlandian Entire Range; Except where listed as Experimental Populations *(Epioblasma brevidens)*
E	Combshell, southern *(Epioblasma penita)*
E	Combshell, upland *(Epioblasma metastriata)*
E	Curlew, Eskimo *(Numenius borealis)*
E	Darter, amber *(Percina antesella)*
E	Darter, boulder *(Etheostoma wapiti)*
T	Darter, goldline *(Percina aurolineata)*
T	Darter, slackwater *(Etheostoma boschungi)*
T	Darter, snail *(Percina tanasi)*
E	Darter, vermilion *(Etheostoma chermocki)*
E	Darter, watercress *(Etheostoma nuchale)*
T	Elimia, lacy (snail) *(Elimia crenatella)*
E	Fanshell *(Cyprogenia stegaria)*
E	Frog, Mississippi gopher Wherever found west of Mobile and Tombigbee Rivers in AL, MS, and LA *(Rana capito sevosa)*
T	Heelsplitter, Alabama (inflated) *(Potamilus inflatus)*
E	Kidneyshell, triangular *(Ptychobranchus greenii)*
E	Lampmussel, Alabama Entire Range; Except where listed as Experimental Populations *(Lampsilis virescens)*
E	Lilliput, pale (pearlymussel) *(Toxolasma cylindrellus)*
E	Lioplax, cylindrical (snail) *(Lioplax cyclostomaformis)*

E Mapleleaf, winged Entire; except where listed as experimental populations *(Quadrula fragosa)*
T Moccasinshell, Alabama *(Medionidus acutissimus)*
E Moccasinshell, Coosa *(Medionidus parvulus)*
E Moccasinshell, Gulf *(Medionidus penicillatus)*
E Monkeyface, Cumberland (pearlymussel) Entire Range; Except where listed as Experimental Populations *(Quadrula intermedia)*
E Mouse, Alabama beach *(Peromyscus polionotus ammobates)*
E Mouse, Perdido Key beach *(Peromyscus polionotus trissyllepsis)*
T Mucket, orangenacre *(Lampsilis perovalis)*
E Mucket, pink (pearlymussel) *(Lampsilis abrupta)*
E Mussel, oyster Entire Range; Except where listed as Experimental Populations *(Epioblasma capsaeformis)*
E Mussel, scaleshell *(Leptodea leptodon)*
E Panther, Florida *(Puma (Felis) concolor coryi)*
E Pearlymussel, cracking Entire Range; Except where listed as Experimental Populations *(Hemistena lata)*
E Pearlymussel, dromedary Entire Range; Except where listed as Experimental Populations *(Dromus dromas)*
E Pearlymussel, littlewing *(Pegias fabula)*
E Pebblesnail, flat *(Lepyrium showalteri)*
E Pigtoe, dark *(Pleurobema furvum)*
E Pigtoe, finerayed Entire Range; Except where listed as Experimental Populations *(Fusconaia cuneolus)*
E Pigtoe, flat *(Pleurobema marshalli)*
E Pigtoe, heavy *(Pleurobema taitianum)*
E Pigtoe, oval *(Pleurobema pyriforme)*
E Pigtoe, rough *(Pleurobema plenum)*
E Pigtoe, shiny Entire Range; Except where listed as Experimental Populations (*Fusconaia cor)*
E Pigtoe, southern *(Pleurobema georgianum)*
E Pimpleback, orangefoot (pearlymussel) *(Plethobasus cooperianus)*
T Plover, piping except Great Lakes watershed *(Charadrius melodus)*
T Pocketbook, finelined *(Lampsilis altilis)*
E Pocketbook, shinyrayed *(Lampsilis subangulata)*
E Riffleshell, tan *(Epioblasma florentina walkeri (E. walkeri))*
E Ring pink (mussel) *(Obovaria retusa)*
E Riversnail, Anthony's Entire Range; Except where listed as Experimental Populations *(Athearnia anthonyi)*
T Rocksnail, painted *(Leptoxis taeniata)*
E Rocksnail, plicate *(Leptoxis plicata)*
T Rocksnail, round *(Leptoxis ampla)*
T Salamander, flatwoods *(Ambystoma cingulatum)*
T Salamander, Red Hills *(Phaeognathus hubrichti)*
T Sculpin, pygmy *(Cottus paulus (pygmaeus))*
T Sea turtle, green except where endangered *(Chelonia mydas)*
E Sea turtle, hawksbill *(Eretmochelys imbricata*)
E Sea turtle, Kemp's ridley *(Lepidochelys kempii)*
E Sea turtle, leatherback *(Dermochelys coriacea)*
T Sea turtle, loggerhead *(Caretta caretta*)
T Shiner, blue *(Cyprinella caerulea)*

E Shiner, Cahaba *(Notropis cahabae)*
E Shiner, palezone *(Notropis albizonatus)*
E Shrimp, Alabama cave *(Palaemonias alabamae)*
T Slabshell, Chipola *(Elliptio chipolaensis)*
E Snail, armored *(Pyrgulopsis (Marstonia) pachyta)*
E Snail, tulotoma *(Tulotoma magnifica)*
T Snake, eastern indigo *(Drymarchon corais couperi)*
E Stirrupshell *(Quadrula stapes)*
E Stork, wood AL, FL, GA, SC *(Mycteria americana)*
E Sturgeon, Alabama *(Scaphirhynchus suttkusi)*
T Sturgeon, gulf *(Acipenser oxyrinchus desotoi)*
T Tortoise, gopher W of of Mobile/Tombigbee Rs. *(Gopherus polyphemus)*
E Turtle, Alabama red-belly *(Pseudemys alabamensis)*
T Turtle, flattened musk species range clarified *(Sternotherus depressus)*
E Wartyback, white (pearlymussel) *(Plethobasus cicatricosus)*
E Whale, finback *(Balaenoptera physalus)*
E Whale, humpback *(Megaptera novaeangliae)*
E Wolf, gray lower 48 States, except MN and where XN; Mexico *(Canis lupus)*
E Woodpecker, red-cockaded *(Picoides borealis)*

Plants -- 18

Status	**Species/Listing Name**
T	Amphianthus, little *(Amphianthus pusillus)*
T	Bladderpod, lyrate *(Lesquerella lyrata)*
T	Button, Mohr's Barbara *(Marshallia mohrii)*
E	Chaffseed, American *(Schwalbea americana)*
T	Fern, Alabama streak-sorus *(Thelypteris pilosa var. alabamensis*)
T	Fern, American hart's-tongue *(Asplenium scolopendrium var. americanum)*
E	Grass, Tennessee yellow-eyed *(Xyris tennesseensis*)
E	Harperella *(Ptilimnium nodosum)*
E	Leather flower, Alabama *(Clematis socialis)*
E	Leather flower, Morefield's *(Clematis morefieldii)*
E	Pinkroot, gentian *(Spigelia gentianoides)*
E	Pitcher-plant, Alabama canebrake *(Sarracenia rubra alabamensis)*
E	Pitcher-plant, green *(Sarracenia oreophila)*
E	Pondberry *(Lindera melissifolia)*
T	Potato-bean, Price's *(Apios priceana)*
E	Prairie-clover, leafy *(Dalea foliosa)*
E	Trillium, relict *(Trillium reliquum)*
T	Water-plantain, Kral's *(Sagittaria secundifolia)*